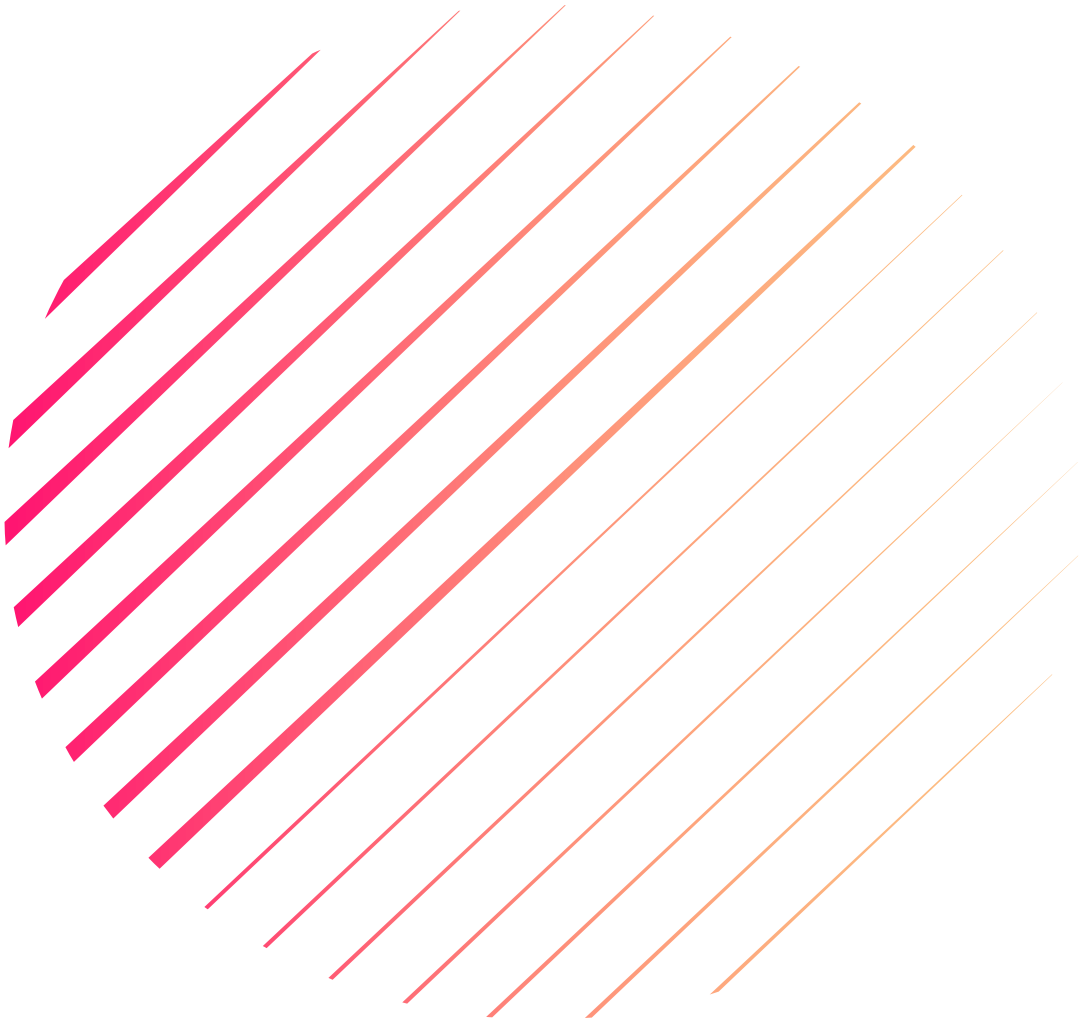
IMAGE PROCESSING



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Spatial and Histogram Processing

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Processes Performed

Within the project folder, 2 source codes are attached. The histogram processing code performs histogram sliding, stretching, equalization and matching.

The spatial filtering code performs box filtering, weighted average filtering, edge detection, sharpening, minimum filtering, maximum filtering, midpoint filtering and median filtering.

Histogram Processing

The original image is first read and converted to grayscale.
To perform histogram sliding, here the histogram is slid by a value of 40 intensity levels. This is done by simply adding the number 40 to the image directly in MATLAB.
To perform histogram stretching, the maximum and minimum intensity values present in the image is found. Using these values, a scaling formula is applied to the image, resulting in the image being scaled from 0 to 255, thus populating the entire histogram.
To perform histogram equalization, the cumulative distribution function is computed.

This CDF is the multiplied by 255 in order to obtain the new gray level mapping. This grey level mapping is used in the next loop and the equalized image is constructed.
To perform histogram specification, the CDF of both the input and the reference image is computed. Mapping is performed by assigning new grey levels of the reference image that has nearest CDF value to the CDF of the particular gray level in the input image.
Finally, all the histograms and images are displayed.

Spatial Filtering

The image is read and converted to grayscale. The kernel size is taken from the user and the kernel is constructed.
This kernel is moved over the image using loops and the elements of the kernel are multiplied with the image and divided by the summation of the kernel for box filter. For min filter, the middle value is replaced by the minimum value of gray level within the are covered by the box. The max filter is done by following the above steps but replacing it with the maximum value. For midpoint, the average of the minimum and maximum value is used. And the median of the values is used for median filtering.