ASSIGNMENT-0

Read Image:

In this function open() from PIL(or pillow) is used, which reads the file, then converts it to an np array using np.array, and also checks if the file is RGBA, if it is RGBA is converted to RGB by taking only the first 3 channels.

Write Image:

This function takes an np array as input, then converts it to image format using fromarray(), then displays it using display(), and also saves it if output path is given using save().

Change Brightness:

This function takes an np array and a parameter K by which brightness should be increased, adds K to the np array to increase the brightness.

Change Contrast:

This function takes np array and contrast range, then normalizes the array using min max normalization, then multiplying with range and adding minContrast value, so that all values in array are moved to contrast range.

Color to Grayscale:

In this three methods Luminosity, Average, and Desaturation are used :
Luminosity method converts to grayscale using a weighted average of the Red, Green, and Blue (RGB) values (0.21R + 0.72G + 0.07B),
Average method simply averages the RGB values (R + G + B) / 3.
Desaturation method converts to grayscale by averaging the maximum and minimum of the RGB values for each pixel.

Grayscale to Color:

In this intensity slicing method has been used, i.e for [0,225] have been sliced into different ranges and for each range some color is assigned, which are black, RGB,CMY, and white, and according to those ranges, array has been masked(for specific color) and transformed similar to change contrast.

Replace Green Screen:

Here all the pixels whose values of green are greater than threshold have been masked, masked pixels are replaced by pixels of background image.

Read video:

This function uses cv2(or opencv), it reads input file using VideoCapture(), and returns np array.

Write Video:

This function creates a video file from a list of frames. It initializes a cv2.VideoWriter object, converts each frame from BGR to RGB format, writes them to the video file, and then saves the video to the specified path.

Video Transitions:

In this function 2 methods fade and slide are used. In fade method weighted average of 2 images is taken for each time frame, i.e (t*image1 + (T - t)*image2)/T, and In the slide method some width of image1 is replaced with image2, and for each frame width of image2 is increased.