What are some Image processing techniques? How can I achieve effects like blur and sharpening of an image? How does image compression and image format conversion work (JPG to PNG, HEIC to PNG etc)?

Image Processing techniques:

Blurring an Image

Grayscaling of Images

Create border around images

Image Translation

Image blurring is a technique used in image processing to reduce sharpness and detail making an image appear smoother. This is done by applying filters also called low-pass filters that smooth finer details. Blurring is used for tasks like noise reduction, or creating artistic effects.

Grayscaling is the process of converting an image from other color spaces e.g. RGB, etc. to shades of gray. It varies between complete black and complete white.

Image translation is the process of shifting an image from one position to another. We simply move the entire image by a fixed number of pixels, either horizontally (along the x-axis) or vertically (along the y-axis).

Adding borders to images

The **cv2.copyMakeBorder()** function in OpenCV allows us to add a border around an image. This can be useful for various image processing tasks such as image padding, creating frames or preparing images for machine learning.

IMAGE COMPRESSION

Image compression reduces the file size of an image, either lossless (no quality loss) or lossy (some quality loss).

In OpenCV:

- **Lossy formats**: JPG/JPEG (reduces size but loses some quality)
- **Lossless formats**: PNG (retains quality, sometimes larger size)

OpenCV handles it by:

- When saving an image with cv2.imwrite(), you can provide **compression parameters**

IMWRITE_JPEG_QUALITY: 0 (lowest quality) to 100 (best quality). Lower → smaller file.

IMWRITE_PNG_COMPRESSION: 0 (no compression) to 9 (max compression). PNG is lossless, so quality remains the same.

IMAGE FORMAT CONVERSION

How OpenCV handles it:

- Read the image with cv2.imread() and save it with a different extension using cv2.imwrite()

OpenCV decides the format from the file extension.