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:

1.Image Enhancement
2.Image Restoration
3.Image Segmentation
4.Image Compression
5.Image Synthesis

➔ You achieve blur and sharpening effects by applying a "kernel" (a small matrix of numbers) to the image using a process called convolution, where the kernel's values determine the output. For blurring, kernels with large values at the center or an averaging effect are used, such as a Gaussian blur kernel. For sharpening, kernels with a positive central value surrounded by negative values are used, which increases contrast at edges, like a Laplacian kernel.

Image Compression

Image compression reduces the file size of an image. There are two main methods:

- **Lossy Compression (e.g., JPG):** Shrinks file size by permanently removing some image details (like colors or fine textures). This saves more space but slightly reduces quality.

- **Lossless Compression (e.g., PNG):** Shrinks file size without removing any information. The image can be restored perfectly, but the file size reduction is usually smaller.

Image Format Conversion

Format conversion means changing an image from one format to another, often using a different compression method. For example, converting a **HEIC** image to **PNG**:

1. **Decoding:** The HEIC file (which uses HEVC compression) is read and decoded.

2. **Rendering:** The decoded data is turned into standard pixels.

3. **Re-encoding:** These pixels are saved in the new format (PNG).

4. **PNG Encoding:** The image is compressed using PNG's lossless method, keeping full quality.

5. **Metadata:** Extra data like EXIF info or color profiles may be lost unless the conversion tool keeps them.