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## EXP1:

**AIM:** To study various image format and the compression techniques.

- **JPEG/JFIF**

JPEG (Joint Photographic Experts Group) is a lossy compression method, JPEG-compressed images are usually stored in the JFIF (liefEG File interchange Format) file format. The JPEG/JFIF filename extension is JPG or JPEG. Nearly every digital camera can save images in the JPEG/FIF format, which supports eight-bit grayscale images and 24-bit color images (eight bits each for red, green, and blue) JPEG applies lossy compression to images, which can result in a significant reduction of the file size. Applications can determine the degree of compression to apply, and the amount of compression affects the visual quality of the result. When not too great, the compression does not noticeably affect or detract from the image's quality, but JPEG files suffer generational degradation when repeatedly edited and saved. (JPEG also provides lossless image storage, but the lossless version is not widely supported.)

- **JPEG 2000**

JPEG 2000 is a compression standard enabling both lossless and lossy storage. The compression methods used are different from the ones in standard JFIF/JPEG; they improve quality and compression ratios, but also require more computational power to process. JPEG 2000 also adds features that are missing in JPEG. It is not nearly as common as JPEG, but it is used currently in professional movie editing and distribution (some digital cinemas, for example, use JPEG 2000 for individual movie frames).

- **GIF**

The GIF (Graphics Interchange Format) is in normal use limited to an 8-bit palette, or 256 colors (while 24-bit color depth is technically possible). GIF is most suitable for storing graphics with few colors, such as simple diagrams, shapes, logos, and cartoon style images, as it uses LZW lossless compression, which is more effective when large areas have a single color, and less effective for photographic or dithered images. Due to GIF's simplicity and age, it achieved almost universal software support. Due to its animation capabilities, it is still widely used to provide image animation effects, despite its low compression ratio compared to modern video formats.

- **PNG**

The PNG (Portable Network Graphics) file format was created as a free, open-source alternative to GIF. supports only 256 colors and a single transparent color. Compared to JPEG, PNG excels when the image has large, uniformly colored areas. Even for photographs - where JPEG is often the choice for final distribution since its compression technique typically yields smaller file sizes - PNG is still well-suited to storing images during the editing process because of its lossless compression. PNG is designed to work well in online viewing applications like web browsers and can be fully streamed with a progressive display option. PNG is robust, providing both full file integrity checking and simple detection of common transmission errors.

## B) Python and OpenCV

- Python

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991. It is used for; web development (server-side), software development, mathematics, system scripting. What can python do?: Python can be used on a server to create web applications. Python can be used alongside software to create workflows. Python can connect to database systems. It can also read and modify files. Python can be used to handle big data and perform complex mathematics. Python can be used for rapid prototyping, or for production-ready software development.

- OpenCV

OpenCV (Open source computer vision) is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage then Itseez (which was later acquired by Intel). The library is cross-platform and free for use under the open-source BSD license. OpenCV supports the deep learning frameworks TensorFlow, Torch/PyTorch and Caffe

**Conclusion:** Various image formats were studied successfully,

