LAB Manual

PART A

(PART A : TO BE REFFERED BY STUDENTS)

**Experiment No. 11**

**A.1 Aim:**

To study different Image compression standards in image processing, lossy compression and lossless compression techniques.

**A.2 Prerequisite:** To study basic knowledge of Image compression.

**A.3 Outcome:**

**After successful completion of this experiment students will be able to**

1. Students will be able to learn how to compression is achieved in image.
2. Students will be able to understand the difference between lossy and lossless compression.

PART B

(PART B : TO BE COMPLETED BY STUDENTS)

***(Students must submit the soft copy as per following segments within two hours of the practical. The soft copy must be uploaded on the Blackboard or emailed to the concerned lab in charge faculties at the end of the practical in case the there is no Black board access available)***

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| --- | --- |
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| Class : MBA Tech CS 3rd Year Div. B | Batch : A |
| Date of Experiment: 13-10-21 | Date of Submission: 19-10-21 |
| Grade : | Time of Submission: |
| Date of Grading: |  |

**B.1 Theory: Image Compression Standards**

**JPEG Standard:**

1. Developed by “Joint Photographic Experts Group”.
2. JPEG is a lossy image compression method.
3. It employs transform coding method using the Discrete Cosine Transform (DCT).
4. JPEG was formally accepted as an international standard in 1992.

BLOCK DIAGRAM FOR JPEG ENCODER
 

1. The main steps involved in JPEG compression are:
   1. Transform RGB to YIQ or YUV and subsample color.
   2. DCT on image blocks
   3. Quantization
   4. Zig-Zag ordering and run-length encoding
   5. Entropy Coding
2. Four commonly used JPEG Modes:
   1. Sequential Mode
   2. Progressive Mode
   3. Hierarchical Mode
   4. Lossless Mode

**DIFFERENCES BETWEEN LOSSY AND LOSSLESS COMPRESSION:**

| **Sr. No.** | **Key** | **Lossy Compression** | **Lossless Compression** |
| --- | --- | --- | --- |
| 1 | Data Elimination | Lossy compression eliminates those bytes which are considered as not-noticeable. | Lossless compression keeps even those bytes which are not-noticeable. |
| 2 | Restoration | After lossy compression, a file cannot be restored to its original form. | After lossless compression, a file can be restored to its original form. |
| 3 | Quality | Lossy compression leads to compromise with quality. | No quality degradation happens in lossless compression. |
| 4 | Size | Lossy compression reduces the size of file to large extent. | Lossless compression reduces the size but less as compared to lossy compression. |
| 5 | Algorithm used | Transform coding, Discrete Cosine Transform, Discrete Wavelet transform, fractal compression etc. | Run length encoding, Lempel-Ziv-Welch, Huffman Coding, Arithmetic encoding etc. |
| 6 | Uses | Lossy compression is used to compress audio, video and images. | Lossless compression is used to compress text, images and sound. |
| 7 | Capacity | Lossy compression technique has high data holding capacity. | Lossless compression has low data holding capacity as compared to lossy compression. |

**B.2 Conclusion:**

Thus, the study of various image compression techniques, lossy and lossless compression techniques in digital image processing, is successfully completed.