

Homework Assignment #3

Understanding the impact of errors in Huffman-encoded images

Description:

Scenario: A raw image file (such as [PPM](#)) is compressed/encoded with [Huffman encoding](#). Then it is stored somewhere in the memory or disk. Later, due to some errors (e.g., bit-flips) in the memory or disk, the encoded image file get affected (i.e., a few of bits/bytes are changed to arbitrary values). When we want to view this image, we apply the Huffman decoding to try to get the original raw image. Since the errors, the decoded image may look different from the original one. But how different it is, can it still be acceptable in certain cases?

Experiments:

Step1:

Write a program that implements Huffman encoding for PPM images. That is, given a PPM image, it creates the Huffman tree, then generates the encoding table: (char, freq, code), as shown [here](#). Note that the “char” here is not english letters but certain length of digits.

Step 2:

Write a program that implements Huffman decoding for PPM images. The input is a pre-encoded image file and the encoding table. The output is the original PPM image file.

Step 3:

Find a couple of PPM images, encode them. Then change a few values (from 1 byte to 50 bytes) in the encoded files. At last, decode these files. And see if how different the resulted images look like, comparing to the original ones.

Finally, write a short report with data and explanation.