Image Encoding User Guide

Run-Length Encoding

Prepared for Dr. Weiss

By Benjamin Kaiser

Compilation:

Compilation for the run-length encoding program should be fairly easy to complete. In the root directory of the submitted code, there is a Makefile. The run-length encoding program can be created by typing “make rle” on the command line.

Usage:

Utilizing the the run-length encoding program to fully encode and decode an image is a two-step process. First an image must be encoded with one run of the program and then must be decoded with another run of the program.

Usage statement general form: `./rle -[e|d] -[r|b] <input file>`

Example:

To encode the cat image using my run-length encoding with the tolerance range currently hard-coded in the runlength.h file, I would issue the following command:

```
./rle -e -r Cat.png
```

This would create a file called Cat.rler in the same directory as the cat image.
The “-e” flag specifies that this will be an encoding operation and the “-r” specifies that this will use the range run-length.

NOTE: This file will ***not*** be a human viewable image and is only the stored compression since it is our understanding that when writing images, OpenCV uses the compression algorithm associated with the file extension that is being written.

Then to decode this, I would issue the following command:

```
./rle -d -r Cat.rler
```

This would produce a file called Catdecodedrange.png in the same directory as the encoded version of the picture. This ***will*** be an image in the PNG format which is human viewable.

A similar usage would apply for bit plane. In this case however, the “-b” flag will replace the “-r” flag.

Changing Tolerance Range

A quick note on the tolerance range value for that specific encoding. This value is currently hardcoded as a const int value in “runlength.h” as TOLERANCERANGE. This will need to be changed and the program recompiled to use a different value.

Upon submission, this value is set to 4 since I saw this as the happy medium between amount of loss and compression rates.

Statistics

A note on statistics as requested by Dr. Weiss.

When encoding an image (command is run with the -e flag) the compression rate statistic in a percentage form is printed.

When decoding an image (command is run with the -d flag) the root mean square error of the intensities between the original image and the decoded image is computed. If the original image is not found,