

Report

We were asked to implement various image filters. The goal was to complete the required filters and a few more in a timely manner.

The general algorithm used for the various filters were double loops in which the pixels of the image are inspected and/or modified as required by the filter. Occasionally the array of pixels were updated in place while other times an entirely new array of pixels was created and possibly modified pixels were placed in it.

Most of the filters I implemented were fairly simple and it seems foolish to discuss the first six which involved removing certain colors from the image except to note that the algorithm was common to each one and as a result I placed said algorithm in a common helper function. The Black and White filter seemed daunting at first but the challenge was easily met by noting that colors of gray are accomplished by assigning each component of the pixel (red, green, and blue) the same value; thus, simply by averaging their sum and replacing each color part with that average results in a nice gray-scale image. The two reflections were also easy because we needed to only swap pixels; for the horizontal reflect, all that was moved were arrays of pixels, and for the vertical reflect, pixels in each row were swapped. The Grow algorithm was likewise simple in that I just created a larger array and copied a single pixel to more than one pixel of the new array. Since the growth was 2X2, one pixel was copied into four of the other and while at first it seemed I was assuming that the original image was a box, on longer reflection and even experimentation, I concluded that the algorithm works fine. Likewise for the shrink algorithm.

For extra filters, I implemented Smooth, Sharpen, Erode, Dilate, and HighlightEdges. I used a group of static functions as helper functions which examined the neighborhood of a pixel which the filter used to adjust the final pixel. No serious complications were noted but I was not overly impressed by the results, either.

Tests were conducted by the user working directly with the images; no automated testing was used for this project.