Assignment 1: Preliminaries

2 Preliminaries: Math

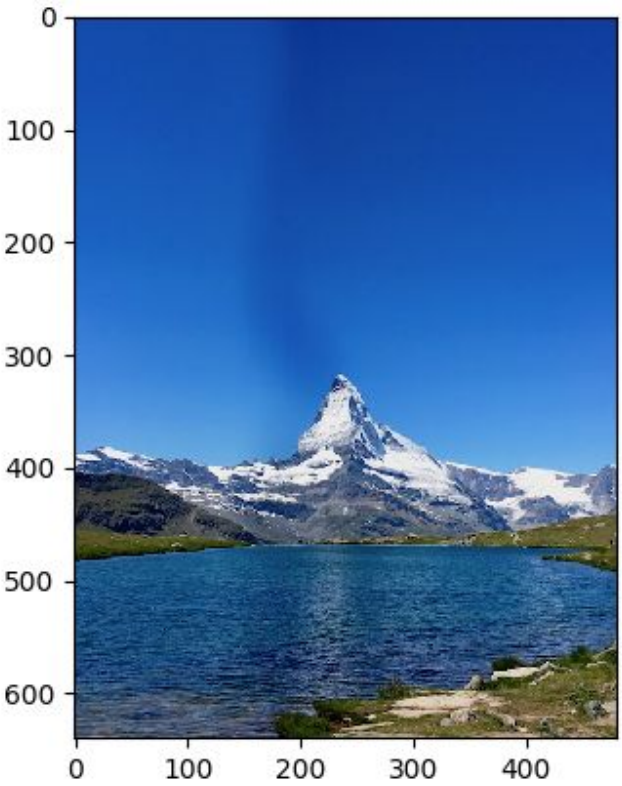
See Paul_2_Math.pdf

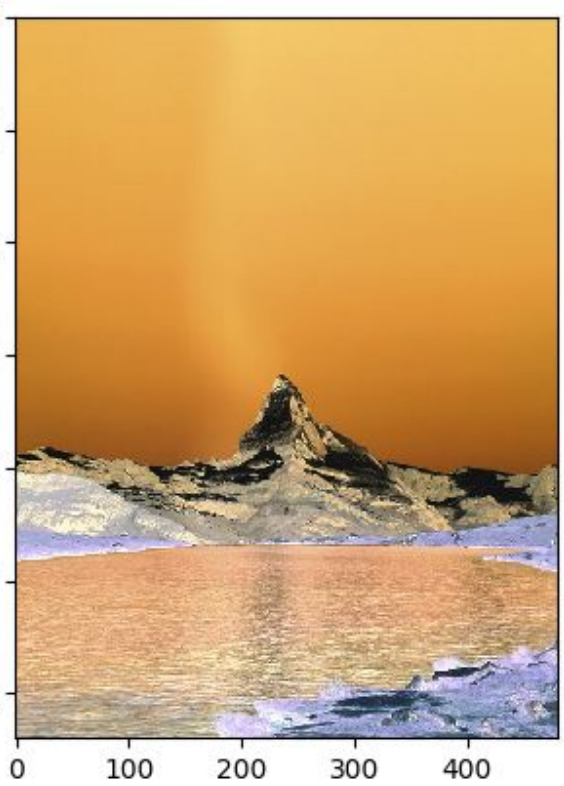
3 Programming

In this assignment we created programs to procedurally extract the edges from an image.

3.2 Read, display and save an image

python solution 3-2.py opens the image ‘input.jpg’, (shown left) inverts it and saves it to ‘output.h5’ (shown right). Not much going on here.

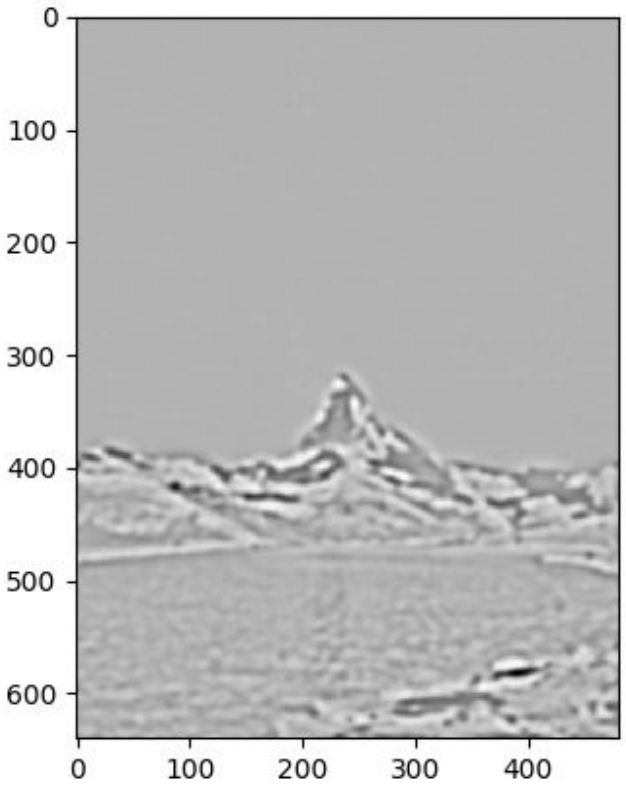




3.3 Read, display and save an image

python solution 3-3.py 3 5 opens the inverted image ‘output.h5’ and reduces the image to a single channel (mean grayscale). I take this image and create two copies with a gaussian filter applied (k1 = 3 and k2 = 5 here). I then take their difference and normalize the result to create an edge image. I display the edge image and save it as ‘filtered.h5’.

Surprised normalization is not included in numpy, but at least broadcasting makes it easy to implement.



3.3 Thresholding

python solution 3-4.py opens the edge image filtered.h5' and applies a threshold setting the 95% lower valued pixels to 0 and displayed the resulting image.

Again, surprised this isn't in numpy. To remove the loop I used broadcasting to create a boolean matrix of all cells with values in the upper 5%, and then multiplied this with the original matrix to set all lower 95% values to 0.