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14.2. Operations on images

When we know that a digital image is a two-dimensional array of numbers, it is quite obvious that we can manipulate the image by performing mathematical operations on the numbers. In this Section we will consider some of the simpler.

14.21 Normalising the intensities

We have assumed that the intensities all lie in the interval $[0,1]$, but as we noted, many formats in facts use integer values in the range 0 - 255. And as we perform computations with the intensities, we quickly end up with intensities outside $[0,1]$ even if we start out with intensities within this interval. We therefore need to be able to normalise the intensities. This we can do with the simple linear function in observation 7.23.

$$g(x) = \frac{x-a}{b-a}, \quad a<b$$

which maps the interval $[a,b]$ to $[0,1]$. A simple case is maping $[0, 255]$ to $[0,1]$ which we accompalish with the scalling $g(x) = x/255$. More generally, typically perform computation that resolt in intensities outside the interval $[0,1]$. we can the compute the minimum and maximum intensities p_{min} ad p_{max} and map the interval $[p_{mins}, p_{max}]$ back to $[0,1]$. Several examples of this will be shown below.