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14.2.6 Smoothing an Image

When we considered filtering of digital sound in Section 4.4.2 of the Norwegian notes, we obsered the the replacing each sample of a sound by an average of the sample and its neighbours dampened the high frequencies of the sound. We can do a similiar operation on images.

Consider the array of numbers given by

$$\frac{1}{16}\begin{pmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 1 \end{pmatrix}.$$

We can smooth an image with this array by placing be centere of the array on a pixel, multiplying the pixel and this, multiplying the pixel and neighbours by the corresponding weigh,

14.2.7 Detecting edges

The final operation on images we are going to consider is edge detection. An edge in an image is charackerised by a large change in intensity values over a small distance in the image. For a continius function this corresponds to a large derivative An image is only defined at isolated point, so we cannot compute derivatives, but we have perfect situation for applying numerical differentiation. Since a grey-level image is a scalar function of two variabel, the numerical differenciation techniavies from Section 13.2 can be applied