

# 1 Kernels

Generalized to arbitrary functions on subregions of images.

```
1 import numpy as np

2 def box(x, y, r):
3     return np.s_[max(0, x-r) : x+r+1, max(0, y-r) : y+r+1]
4 def mapbox(r, f, a):
5     return np.reshape([f(a[box(*i, r)]) for i in np.ndindex(np.shape(a))], np.shape(a))
6 def mapboxes(rs, f, a):
7     return (mapbox(r, f, a) for r in rs)
8 def mapallboxes(f, a):
9     return mapboxes(range(max(np.shape(a))), f, a)
10
11 def mapblocks(h, w, f, a):
12     return np.array([[f(y) for y in np.array_split(x, w, axis=1)]
13                      for x in np.array_split(a, h)])
```