Exercise Sheet 8

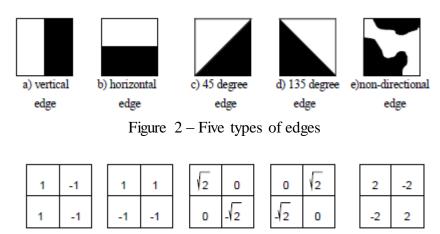
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- **1. Texture descriptors Local Binary Patterns.** Create a 256 coefficient descriptor that consists of a histogram of texture binary patterns for each pixel.
 - Idea: Compare the *intensity* value of a pixel with its 8 neighbors.
 - Start on the upper left corner.
 - The result of the comparison is 1 if the value of the neighbor is larger or equal to the pixel value. Otherwise the result is 0.
 - Combine all the results into a single byte (using *bit-shifting*), thus creating a *binary pattern* for each pixel.
 - Create the histogram of the occurrences of each *binary pattern* for the whole image.

5	4	3	Threshold	Ι	I	I	
4	3	Ι		ı		0	
2	0	3		0	0	ı	
Binary Pattern: 1110100							

- 2. **Texture Descriptors Local Edge Histograms.** Create an 80 coefficient descriptor that consists of a histogram of edge patterns for 16 sub-regions of the image.
 - Divide the image into 16 regions (4x4) with the same number of pixels.
 - For each region, apply 5 edge detectors using the digital filters represented in Figure 3.
 - The filter with the strongest response is the result for each pixel. If this response is weaker than a pre-defined threshold (ex: 11), the result for this pixel should be 'no edge' (hence, not accounted for in the histogram).
 - Create an edge histogram for each block, in which you count the occurrences of pixels with: vertical edge, horizontal edge, 45 degree edge, 135 degree edge, non-directional edge.
 - Concatenate the 16 histograms into a single 80 coefficient vector.

Note: For more details read the support file: "VC 1415 P8 LEH.pdf"



a) ver_edge_filter() b) hor_edge_filter() c) dia45_edge_filter() d) dia135_edge_filter() e) nond_edge_filter()
Figure 3 - 2x2 filter masks for detecting edges