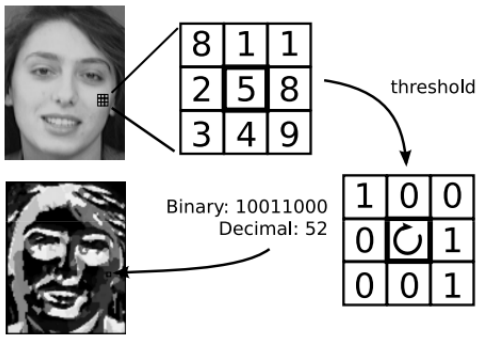
Local Binary Pattern

LBP

Local Binary Pattern

T. Ojala, M. Pietikinen, and D. Harwood, *(1996)*



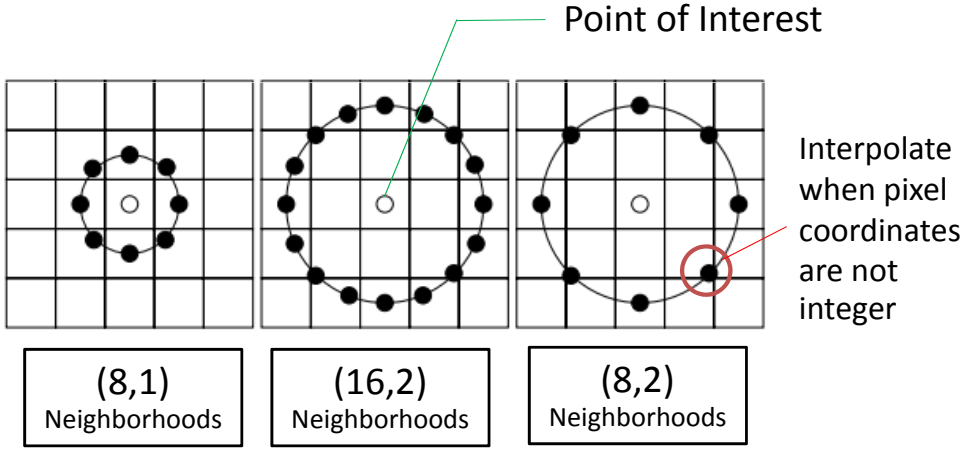
- Textural feature
- Used in face recognition
- For more information on variations of LBP

http://www.eecs.qmul.ac.uk/~cfshan/papers/huang-shan-etal-smcc11.pdf

http://link.springer.com/chapter/10.1007%2F978-0-85729-748-8_2

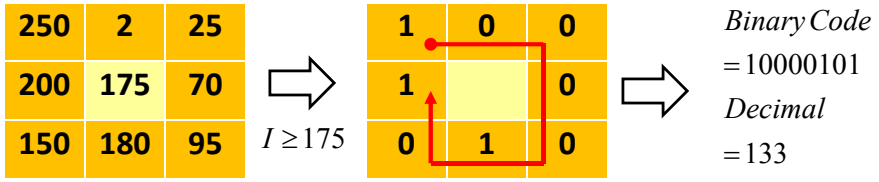
http://asoto.ing.puc.cl/papers/Maturana-09.pdf

Neighborhoods



http://link.springer.com/chapter/10.1007%2F978-0-85729-748-8_2

LBP Extraction

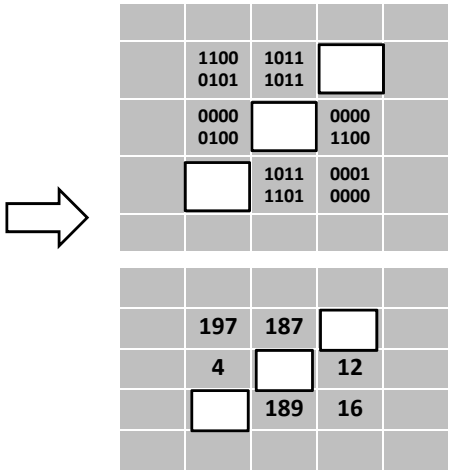


[1] Scan every pixel one by one.
[2] For each pixel, threshold the neighbor pixels by central pixel value
[3] Extract binary code from [2] (for example, start from upper right corner in clockwise direction)
[4] Find a decimal number that equivalent to the binary code

LBP Extraction

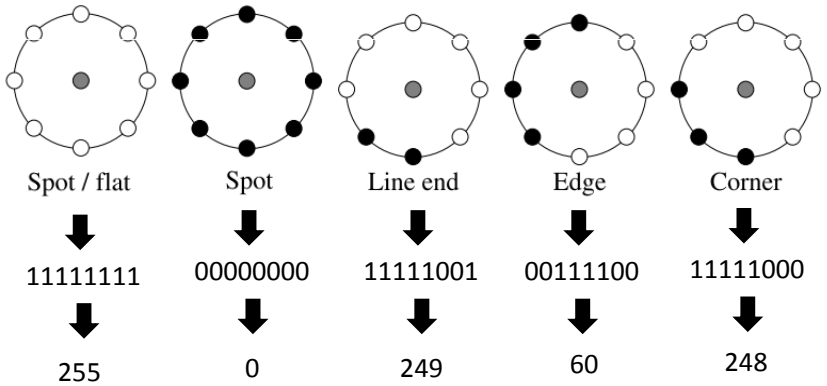
255	250	0	2	0
250	240	1	5	0
0	255	0	250	200
1	255	7	255	255
4	2	10	20	5

Original Image

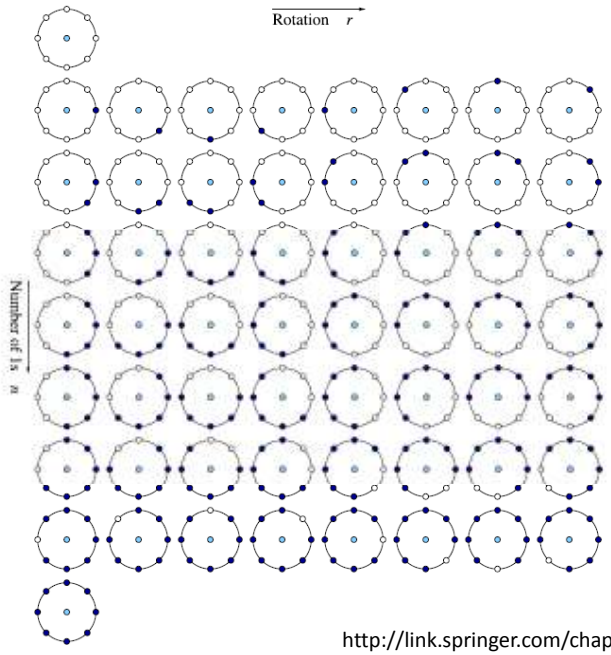


LBP Image

Texture primitives



http://link.springer.com/chapter/10.1007%2F978-0-85729-748-8_2



List of Uniform Pattern

Uniform Pattern
= #Transition ≤ 2

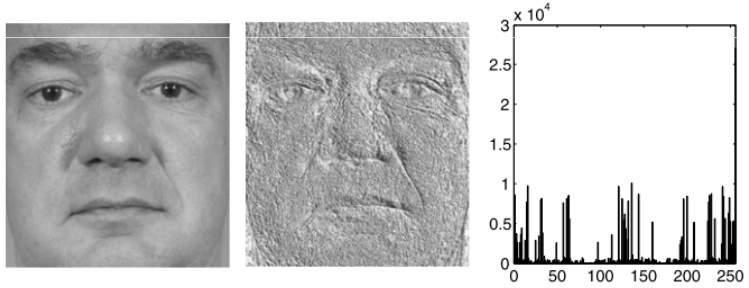
Ex: 00000000, 01110000, 11001111, 11111111,

Non-Uniform Pattern
= #Transition > 2

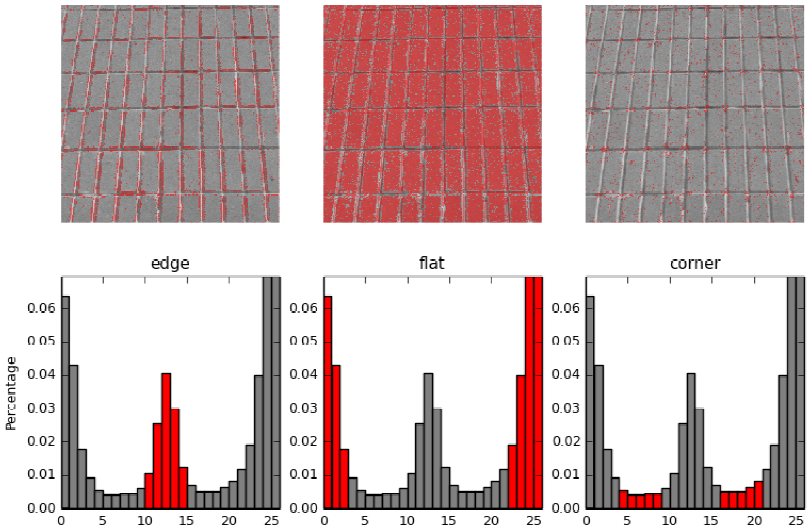
Ex: 11001001, 01010011

http://link.springer.com/chapter/10.1007%2F978-0-85729-748-8_2

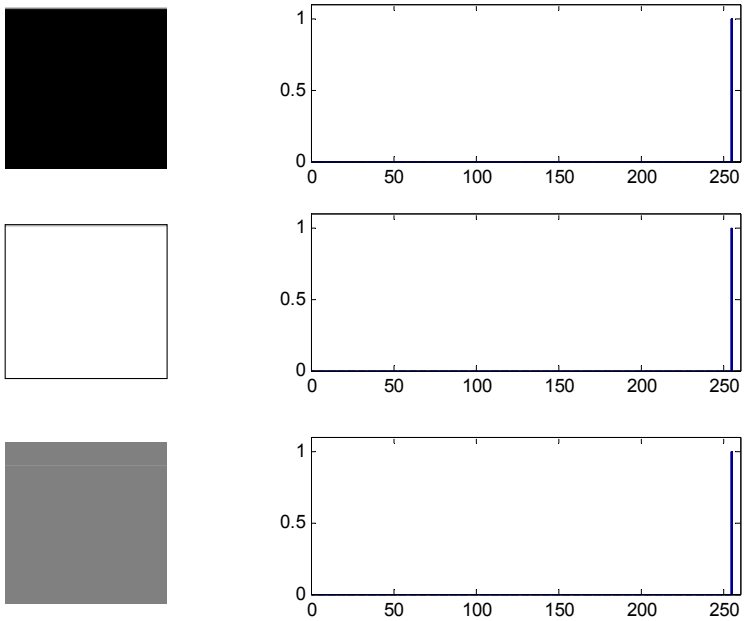
Histogram of LBP

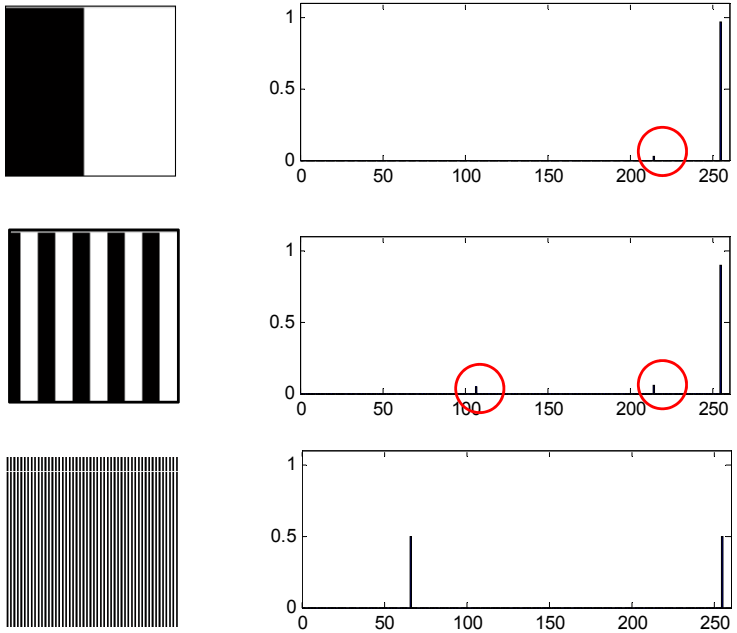


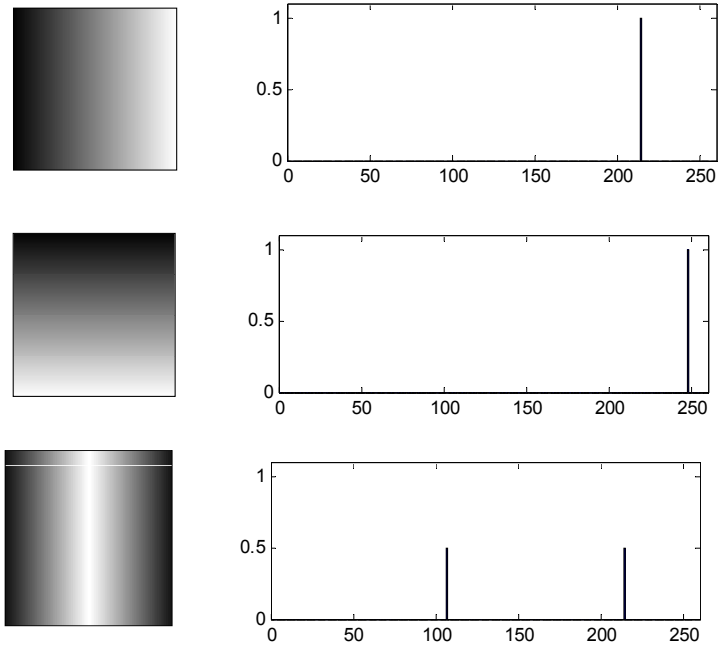
http://link.springer.com/chapter/10.1007%2F978-0-85729-748-8_2

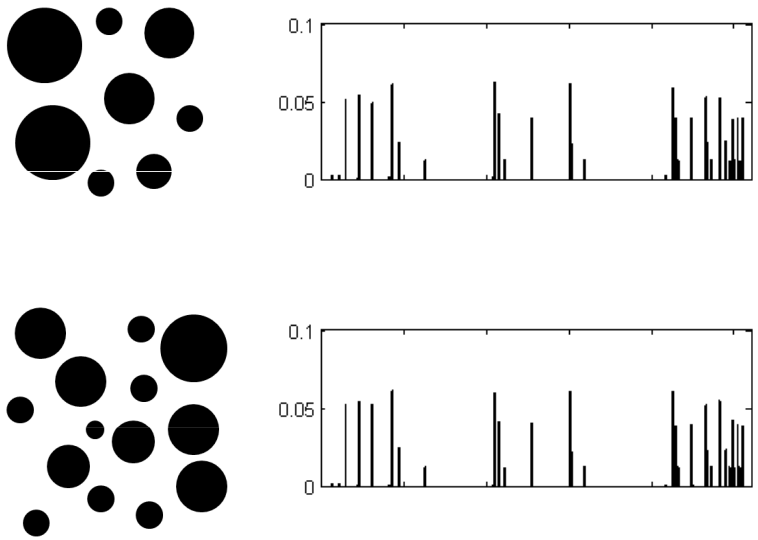


http://scikit-image.org/docs/dev/auto_examples/plot_local_binary_pattern.html



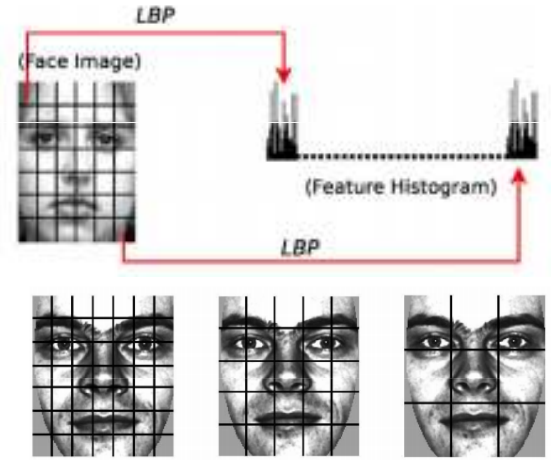






Remove pattern 255 (flat)

LBP for Face Recognition



http://www.eecs.qmul.ac.uk/~cfshan/papers/huang-shan-etal-smcc11.pdf

http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=1717463&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxpls%2Fabs_all.jsp%3Farnumber%3D1717463

Pre-processing

Before

After

- Gamma Correction
- Filtering
- Masking
- Histogram Equalization

http://class.inrialpes.fr/pub/107-tan-cvpr07.pdf