• Binary Descriptors.

- Select a area around a pixel, then select a number of pairs between the pixels in the area.
- Compute comparison between each intensity in pair.

$$b = \begin{cases} 1 & \text{if } I(s_2) > I(s_1) \\ 0 & \text{else} \end{cases}$$

Concatenate all b's to a bit string.

If (s_1, s_2)

Pairs $(s,1)(s,9)(4,6)(8,2)(3,7)$

$b = \quad 0 \quad 0 \quad 0 \quad 1 \quad 1$

Example

0	255	100
100	100	0
255	0	50

Intensities

1	2	3
4	5	6
7	8	9

index

Final descriptor is 00011.

$B = 00011.$

This results in a very concise descriptor that is computed using pairs that are chosen based on certain strategy.

- Pros
  1. compact descriptor.
  2. fast to compute.
  3. trivial and fast to compare. Can be done using Hamming distance.

$$d_H(B_1, B_2) = \text{sum}(\text{xor}(B_1, B_2))$$

same pairs,

- Stragedy must be fixed, the order of chosen pairs must be mainted from one image to another. Most binary descriptors mainly differ by stragedy.
- Examples of binary descriptors is BRIEF, and ORB.