Task 3: SIFT (pen & paper)

Consider Figure 2, which shows a normalized orientation histogram for a SIFT keypoint after weighting[1].

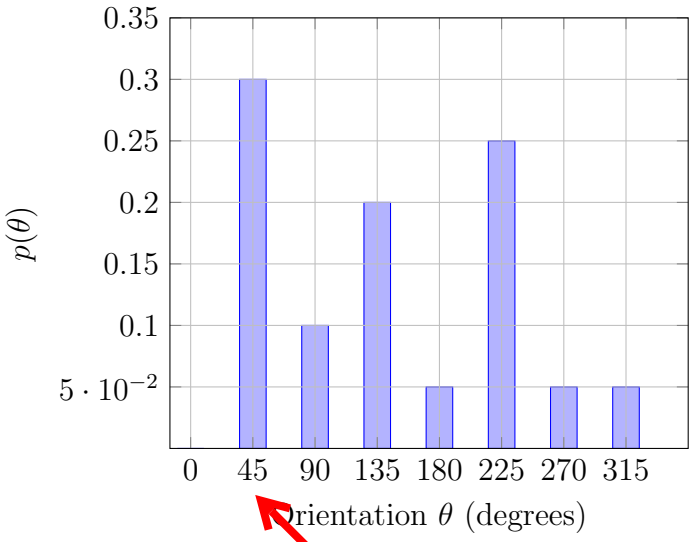

Figure 2: A normalized orientation histogram of a SIFT keypoint.

(a) What is the dominant local direction of the keypoint?

45° is the dominant local direction. Because in this orientation the number of sample points are maximum.

(b) How many new keypoints will be created, and why? What are their orientations?

Only 80% of the peak value is used to find out the other orientations

Thus:
- peak value (45°) : 0.3
- 80% of 0.3 = 0.24

There's only one peak value left greater than 0.24 -> peak value(225): 0.25.

So, only one new key point will be created and its orientation will be 225 °

From the slides:

The strongest bin gives us the keypoint orientation

But: create also a keypoint for all bins with values of at least 80% of the strongest keypoint

[1]For simplicity, we consider an 8-bin orientation histogram. In the original SIFT algorithm, 36 bins are used.