Computer Vision
Exercise 4

Gruppe 26
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December 2022

Task 1

(a) The dominant local direction of the keypoint is 45° because the histogram shows the highest peak at 0.3 for the 45° bin.

(b) The magnitude of the second largest bin (225°) is within the 80% threshold of the highest peak ($0.25/0.30 = 83\%$). But the next lower bin (135°) is not ($0.20/0.30 = 66\%$).

That is why two keypoints are created: one for the dominant direction of 45° and one for the second strongest direction of 225°.

Task 2

$$\text{UE}(G_1) = \frac{\text{Area}(S_1) + \text{Area}(S_4) - \text{Area}(G_1)}{\text{Area}(G_1)} = \frac{3 + 8 - 4}{4} = 2$$

$$\text{UE}(G_2) = \frac{\text{Area}(S_3) - \text{Area}(G_2)}{\text{Area}(G_2)} = \frac{2 - 2}{2} = 0$$