东南大学
网络空间安全学院

Feature detector and descriptor

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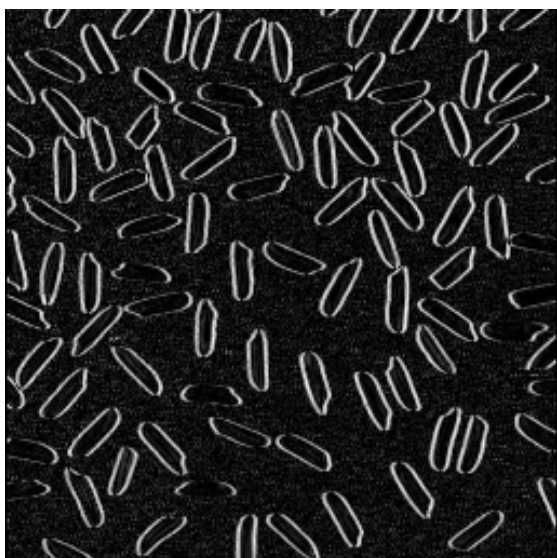
Course: 图象分析与理解 – Professor: 季续
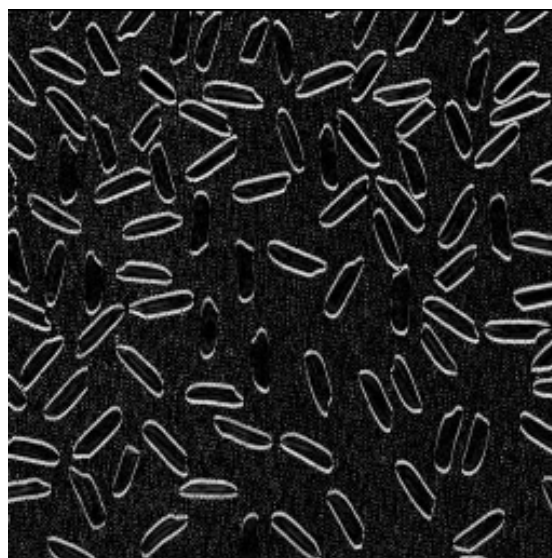Due date: *6 月 5 日, 2022 年*

1. Harris Corner Detection

Solution.

1. Image Gradients

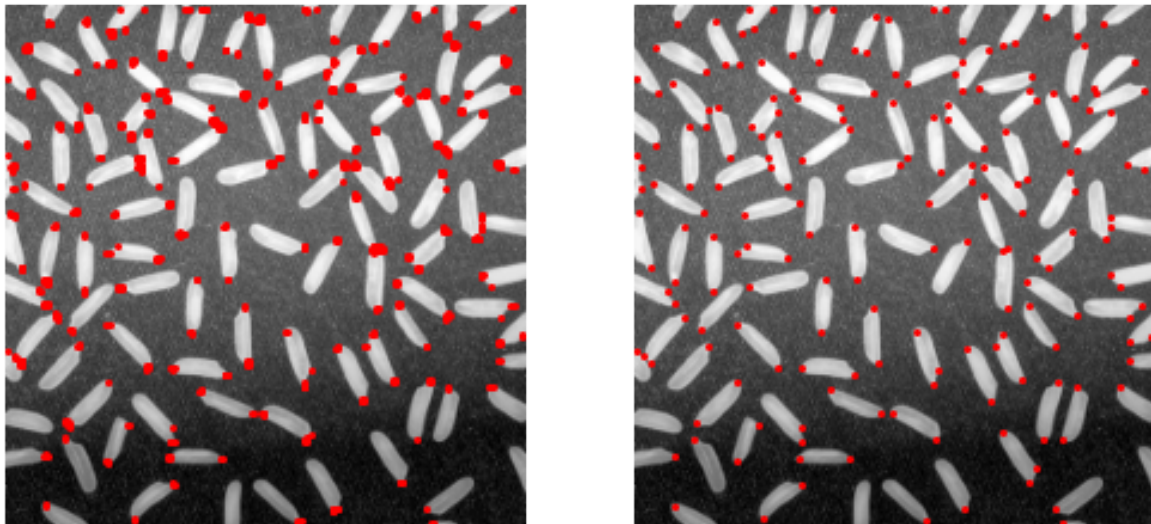(a) Vertical edges computed with I_x (b) Horizontal edges computed with I_y

Figure 1: Edges of the rice image

2. Harris corner detection result is shown as Figure 2.
   Figure 2a: Threshold the corner response with $0.2 \times R_{max}$ without non-maximum suppression.
   Figure 2b: Find the local maxima of the peaks after thresholding the corner response.

(a) Harris corner detection without NMS (b) Harris corner detection with NMS

Figure 2: Harris corner detection result

2. Image Registration and Stitching

Solution.

1. Feature pairs are shown as Figure 3.
   Feature points in *img_1*:

   [190, 72], [204, 98], [279, 73], [167, 277], [235, 271], [288, 317], [159, 403], [281, 403]

   Feature points in *img_2*:

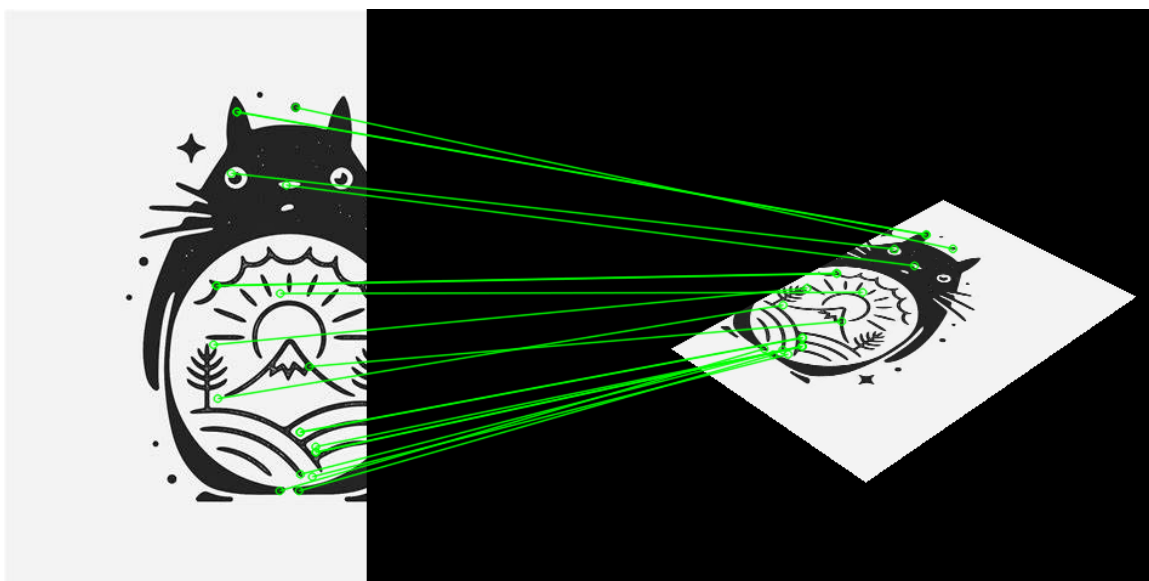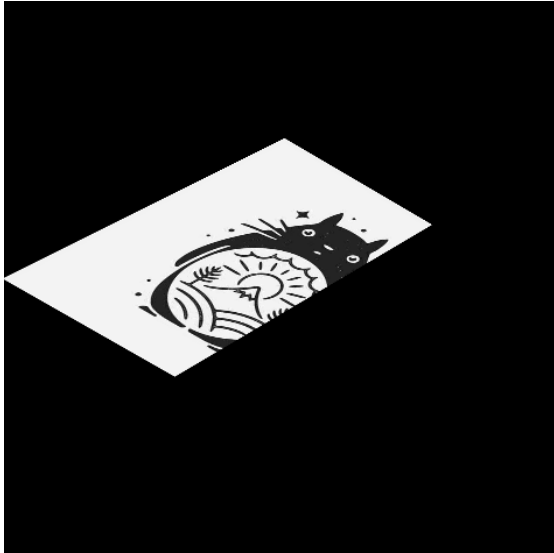   [285, 184], [282, 193], [328, 206], [185, 228], [219, 246], [221, 273], [117, 261], [175, 298]

Figure 3: Pairs of feature points

2. Matrix $\overrightarrow{p} == \begin{bmatrix} 0.417 & -0.503 & 239.502 \\ 0.244 & 0.189 & 117.347 \\ 0 & 0 & 1 \end{bmatrix}$

3. img_1$'$ is shown as Figure 4a. Result of stitching img_**1** and img_**2**: img_**3** is shown as Figure 4b.

(a) Perspective transform of img_1$'$

(b) Image stitching

Figure 4: Edges of the rice image