電腦視覺 hw4 資工所碩一 R09922127 林聖哲

Python 版本 3.6.12
使用套件 cv2, numpy, matplotlib

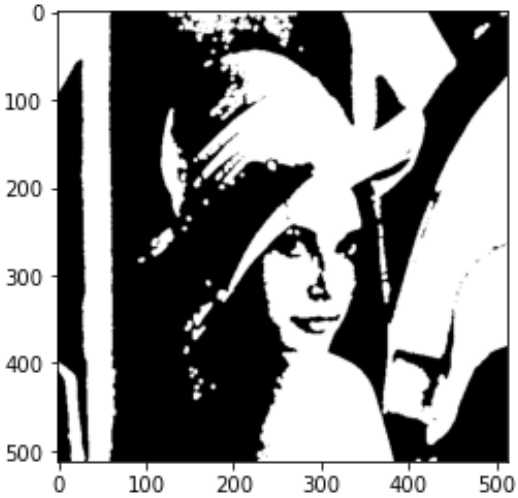
先將圖片二值化 產生原圖如下

Write programs which do binary morphology on a binary image:

(a) Dilation

$$A \oplus B = \{c \in E^N \mid c = a + b \text{ for some } a \in A \text{ and } b \in B\}$$

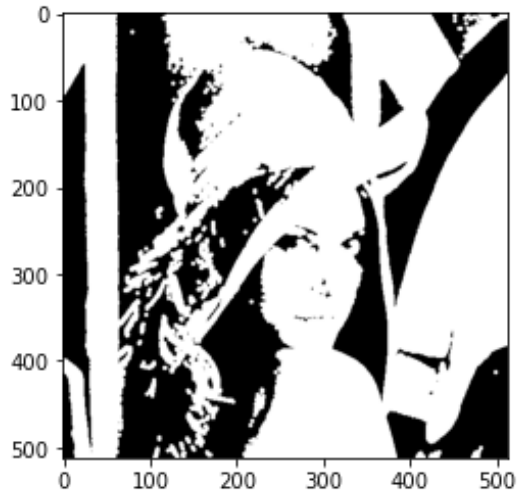
掃描原圖每個 pixel 如果為白點，則以此點為 kernel 原點做擴張，產生新的擴張的圖



(b) Erosion

$$A \ominus B = \{x \in E^N | x + b \in A \text{ for every } b \in B\}$$

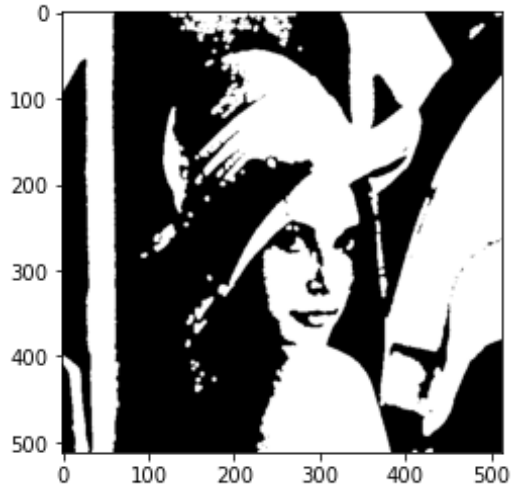
掃描原圖每個 pixel，以此點為 kernel 原點看是否包含 kernel，若無包含則在新的對應的圖為黑點，反之為白點



(c) Opening

$$B \circ K = (B \ominus K) \oplus K$$

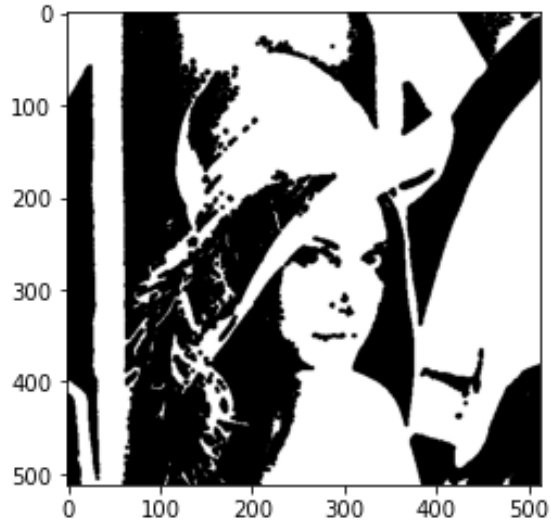
先對原圖做 erosion 再做 dilation



(d) Closing

$$B \bullet K = (B \oplus K) \ominus K$$

先對原圖做 dilation 再做 erosion



(e) Hit-and-miss transform

J,K kernels satisfy $J \cap K = \emptyset$

hit-and-miss of set *A* by (*J*,*K*)

$$A \otimes (J, K) = (A \ominus J) \cap (A^c \ominus K)$$

J K kernel 的設置跟課本一樣
原圖對 J 做 erosion
補圖對 K 做 erosion
兩個再取交集
產生下圖