

410415069 電機三 陳毅軒

# HW3.1 Hough Transform

for all  $\theta$ ,  $x \cos \theta + y \sin \theta$

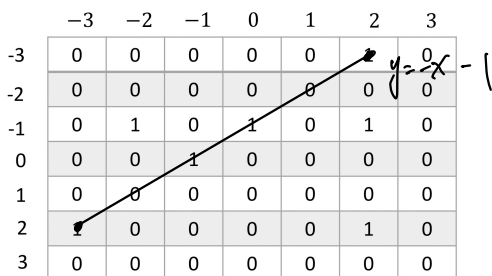
$(x,y) \backslash \theta$	$-45^\circ$	$0^\circ$	$45^\circ$	$90^\circ$
$(2,-3)$	3.54	2	-0.71	-3
$(0,-1)$	0.71	0	-0.91	-1
$(2,-1)$	2.12	2	0.91	-1
$(-1,0)$	-0.91	-1	-0.91	0
$(-3,2)$	-3.54	-3	-0.91	2
$(2,2)$	0	2	2.83	2

	-3.54	-3	-1	-0.71	0	0.91	2	2.12	2.83	3.54
$-45^\circ$	1			1	1	1		1		1
$0^\circ$		1	1		1		3			
$45^\circ$				4		1			1	
$90^\circ$		1	2		1		2			

最大值出現在  $x \cos 45^\circ + y \sin 45^\circ = -0.91$

$$\Rightarrow y = -x - \frac{0.91 \times 2}{\sqrt{2}} = -x - 1.004$$

$$\Rightarrow y = -x - 1, \text{ 過 } (0, -1), m = -1$$



# HW3.2 Skeletonization

0	0	0	0	0	0	0	0	0
0	0	0	1	1	1	1	1	0
0	0	0	1	1	1	1	1	0
0	1	1	1	1	1	1	1	0
0	1	1	1	1	1	1	1	0
0	1	1	1	1	0	0	0	0
0	1	1	1	1	0	0	0	0
0	0	0	0	0	0	0	0	0

A

0	0	0	0	0	0	0	0	0
0	0	0	0	1	1	0	0	0
0	0	0	1	1	1	1	1	0
0	0	1	1	1	1	1	1	0
0	1	1	1	1	1	0	0	0
0	1	1	1	1	0	0	0	0
0	0	1	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0

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

0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	1	0	0
0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	0
0	1	0	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0

$A \ominus B$

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	1	1	0	0	0
0	0	0	1	1	1	0	0	0
0	0	1	1	1	0	0	0	0
0	0	1	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

$A \ominus B$

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0
0	0	0	1	1	1	0	0	0
0	0	1	1	1	0	0	0	0
0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

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

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

$(A \ominus B) - ((A \ominus B) \circ B)$

0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	1	0	0
0	0	0	0	0	1	0	0	0
0	1	0	0	1	0	0	0	0
0	0	0	1	0	0	1	0	0
0	0	1	0	0	0	0	0	0
0	1	0	0	1	0	0	0	0
0	0	0	0	0	0	0	0	0

$A \ominus B$

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0
0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

$A \ominus B$

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

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

0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0
0	0	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

$(A \ominus B) - ((A \ominus B) \circ B)$