ນ ໃຈປະສົງ ວົງພັນສີ 3CS2

ວຽກບ້ານ

❖ ຈົ່ງໃຊ້ວິທີ Gradient ແລະ ວິທີ Laplacian ເພື່ອຊອກຫາພາບຂອບ ຂອງຂໍ້ມູນພາບລຸ່ມນີ້.

56	90	21	234
18	9	12	2
0	5	0	0
0	2	1	9

I(x, y)

0	1	0
1	-4	1
0	1	0

ໜ້າກາກ H(x, y) ສຳລັບວິທີ Laplacian.

$H_R = \frac{1}{4}$

-1	-2	-1
0	0	0
1	2	1

$H_C = \frac{1}{4}$

1	0	-1
2	0	-2
1	0	-1

ໜ້າກາກ Sobel ສຳລັບວິທີ Gradient

<u>ແກ້</u>

➢ ວິທີ Gradient ໂດຍໃຊ້ໜ້າກາກ Sobel:

- ຂັ້ນຕອນທີ 1: ຂະຫຍາຍຂອບພາບໂດຍການຕື່ມຄ່າສູນ

0	0	0	0	0	0
0	56	90	21	234	0
0	18	9	12	2	0
0	0	5	0	0	0
0	0	2	1	9	0
0	0	0	0	0	0

I(x,y) ທີ່ຕື່ມຄ່າສູນແລ້ວ

- ขั้นตอนที่ 2: หาค่า $G_R(x,y) = |I(x,y) * H_R(x,y)|$

0	0	0	0	0	0
0	56	90	21	234	0
0	18	9	12	2	0
0	0	5	0	0	0
0	0	2	1	9	0
0	0	0	0	0	0

H_R

$\frac{1}{4}$

-1	-2	-1
0	0	0
1	2	1

$G_R(1,1) = \frac{1}{4}|(18x2) + (9x1)| = \frac{1}{4}|36 + 9| = 11.25 \approx 11$

$G_R(1,2) = \frac{1}{4}|(18x1) + (9x2) + (12 \times 1)| = \frac{1}{4}|18 + 18 + 12| = 12$

$G_R(1,3) = \frac{1}{4}|(9x1) + (12x2) + (2 \times 1)| = \frac{1}{4}|9 + 24 + 2| = 8.75 \approx 9$

$G_R(1,4) = \frac{1}{4}|(12x1) + (2x2)| = \frac{1}{4}|12 + 4| = 4$

$G_R(2,1) = \frac{1}{4}|(56x(-2)) + (90x(-1)) + (5 \times 1)| = \frac{1}{4}|-112-90+5| = 49.25 \approx 49$

$G_R(2,2) = \frac{1}{4}|(56x(-1)) + (90x(-2)) + (21 \times(-1)) + (5x2)| = \frac{1}{4}|-56 -180 -21+10| = 61.75 \approx 62$

$G_R(2,3) = \frac{1}{4}|(90x(-1)) + (21x(-2)) + (234 \times(-1)) + (5x1)| = \frac{1}{4}|-90-42-234+5| = 90.25 \approx 90$

$G_R(2,4) = \frac{1}{4}|(21x(-1)) + (234x(-2))| = \frac{1}{4}|-21-468| = 122.25 \approx 122$

$G_R(3,1) = \frac{1}{4}|(56x(-2)) + (90x(-1)) + (5 \times 1)| = \frac{1}{4}|-112-90+5| = 49.25 \approx 49$

$G_R(3,2) = \frac{1}{4}|(56x(-1)) + (90x(-2)) + (21 \times(-1)) + (5 \times 2)| = \frac{1}{4}|-56-180-21+10| = 61.75 \approx 62$

$G_R(3,3) = \frac{1}{4}|(90x(-1)) + (21x(-2)) + (234 \times(-1)) + (5 \times 1)| = \frac{1}{4}|-90-42-234+5| = 90.25 \approx 90$

$G_R(3,4) = \frac{1}{4}|(21x(-1)) + (234x(-2))| = \frac{1}{4}|-21-468| = 122.25 \approx 122$

$G_R(4,1) = \frac{1}{4}|(5 \times(-1)| = 1.25 \approx 1$

$G_R(4,2) = \frac{1}{4}|(5 \times(-2)| = 2.5 \approx 3$

$G_R(4,3) = \frac{1}{4}|(5 \times(-1)| = 1.25 \approx 1$

$G_R(4,4) = 0$

ສຸດທ້າຍຈະໄດ້:

11	12	9	4
49	62	90	122
49	62	90	122
1	3	1	0

- ຂັ້ນຕອນທີ 3: ຫາຄ່າ $G_C(x,y) = |I(x,y) * H_C(x,y)|$

0	0	0	0	0	0
0	56	90	21	234	0
0	18	9	12	2	0
0	0	5	0	0	0
0	0	2	1	9	0
0	0	0	0	0	0

H_C

$\frac{1}{4}$

1	0	-1
2	0	-2
1	0	-1

$G_C(1,1) = \frac{1}{4}|(90x(-2) + (9x(-1)| = \frac{1}{4}|-180 -9| = 47.25 \approx 48$

$G_C(1,2) = \frac{1}{4}|(56x2) + (21x(-2)) + (18 x 1) x (12 x(- 1))| = \frac{1}{4}|112-42+18- 12| = 19$

$G_C(1,3) = \frac{1}{4}|(90x2) + (234x(-2) + (9 x 1) + (2 x (-1))| = \frac{1}{4}|180-468 + 9-2| = 70.25 \approx 70$

$G_C(1,4) = \frac{1}{4}|(21x2) + (12x1)| = \frac{1}{4}|42 + 12| = 13.5 \approx 14$

$G_C(2,1) = \frac{1}{4}|(90x(-1)) + (9x(-2)) + (5 x(- 1)| = \frac{1}{4}|-90-18-5| = 28.25 \approx 28$

$G_C(2,2) = \frac{1}{4}|(56x1) + (21 x(- 1)) + (18x2)+ (12x(-2))| = \frac{1}{4}| 56 -21+36-24 | = 11.75 \approx 12$

$G_C(2,3) = \frac{1}{4}|(90x1)) + (234 x(- 1)) + (9x2)+ (2x(-2)) + (5x1)| = \frac{1}{4}| 90-234+18-4+5| = 31.25 \approx 31$

$G_C(2,4) = \frac{1}{4}|(21x1)+ (12x2)| = \frac{1}{4}| 21+24 | = 11.25 \approx 11$

$G_c(3,1) = \frac{1}{4}|(9x(-1)) + (5x(-2)) + (2\ x(-\ 1))| = \frac{1}{4}|-9-10-2| = 5.25 \approx 5$

$G_c(3,2) = \frac{1}{4}|(18x-1) + (12x(-1)) + (1\ x(-\ 1))| = \frac{1}{4}|-18-12-1| = 7.75 \approx 8$

$G_c(3,3) = \frac{1}{4}|(9x1)+ (2x(-1)) + (5\ x\ 2) +\ (2\ x\ 1) + (9x(-1))\ | = \frac{1}{4}|9-2+10+2-9| = 2.5 \approx 3$

$G_c(3,4) = \frac{1}{4}|(12x1) + (1x1)| = \frac{1}{4}|12+1| = 3.25 \approx 3$

$G_c(4,1) = \frac{1}{4}|(5\ x\ (-1)+(2x(-2))| = \frac{1}{4}|-5-4| = 2.25 \approx 2$

$G_c(4,2) = \frac{1}{4}|(1\ x(-\ 2)| = 0.5 \approx 1$

$G_c(4,3) = \frac{1}{4}|(5\ x\ 1) + (2x2) + (9x(-2))\ | = 2.25 \approx 2$

$G_c(4,4) = \frac{1}{4}|(1x\ 2)| = 0.5 \approx 1$

ສຸດທ້າຍຈະໄດ້:

48	19	70	14
28	12	31	11
5	8	3	3
2	1	2	1

- ຜົນໄດ້ຮັບການຫາຂອບພາບ ໂດຍໃຊ້ວິທີ Gradient ໂດຍໃຊ້ໜ້າກາກ Sobel

11	12	9	4
49	62	90	122
49	62	90	122
1	3	1	0

$$G_R(x,y) = |I(x,y) * H_R(x,y)|$$

48	19	70	14
28	12	31	11
5	8	3	3
2	1	2	1

$$G_C(x,y) = |I(x,y) * H_C(x,y)|$$

59	31	79	28
77	74	121	133
54	70	93	125
3	4	3	1

$$G(x,y) = |I(x,y) * H(x,y)|$$

- ວິທີ Laplacian ໂດຍໃຊ້ໜ້າກາກ H*(x,y)*

- ຂັ້ນຕອນທີ 1: ຂະຫຍາຍຂອບພາບໂດຍການຕື່ມຄ່າສູນ

0	0	0	0	0	0
0	56	90	21	234	0
0	18	9	12	2	0
0	0	5	0	0	0
0	0	2	1	9	0
0	0	0	0	0	0

I(x,y) ທີ່ຕື່ມຄ່າສູນແລ້ວ

- ຂັ້ນຕອນທີ 2: ຫາຄ່າ $G(x,y) = |I(x,y) * H(x,y)|$

0	0	0	0	0	0
0	56	90	21	234	0
0	18	9	12	2	0
0	0	5	0	0	0
0	0	2	1	9	0
0	0	0	0	0	0

0	1	0
1	-4	1
0	1	0

$H(x,y)$

G(1,1) = |(56x(-4) + (90x1)+(18x1)| = |-244 + 90 + 18| = 116

G (1,2) = $G(1,2) = |(56 \times 1) + (90 \times (-4)) + (21 \times 1) + (9 \times 1)| = 274$

G (1,3) = |(90x1) + (21x(-4))+(234x1)+(12x1)| = |90-84+234+12| = 252

G (1,4) = |(21x1) + (234x(-4))+(2x1)| = |21-936 + 2| = 913

G(2,1) = |(56x1) + (18x(-4))+(9x1)| = |56-72 + 9| = 7

G (2,2) = |(90x1) + (18x1)+(9x(-4)) + (12x1) + (5x1)| = |90+18-36 + 12+5|= 89

G (2,3) = |(21x1) + (9x1)+(12x(-4)) + (2x1)| = |21+9-48 + 2|= 16

G (2,4) =|(234x1) + (12x1)+(2x(-4)) | = |234+12-8 |= 238

G (3,1) = |(18x1) + (5x1)| = |18 + 5 |= 23

G (3,2) = |(9x1) + (5x(-4))+(2x1)| = |9-20 + 2|= 9

G (3,3) = |(12x1) + (5x1) + (1x1)| = |12 + 5 + 1 |= 18

G (3,4) = |(2x1) + (9x1)| = |2 + 9 |= 11

G (4,1) =|(2x1)|= 2

G (4,2) = |(5x1) + (2x(-4))+(1x1)| = |5 -8 +1 |= 2

G (4,3) = |(2x1) + (1x(-4))+(9x1)| = |2-4+9 |= 7

G (4,4) = |(1x1) + (9x(-4)| = |1-36 |= 35

- ຜົນໄດ້ຮັບການຫາຂອບພາບ ໂດຍໃຊ້ວິທີ Laplacian ໂດຍໃຊ້ໜ້າກາກ H(*x*,*y*)

56	90	21	234
18	9	12	2
0	5	0	0
0	2	1	9

I(*x*,*y*)

116	274	252	913
7	89	16	238
23	9	18	11
2	2	7	35

$G(x, y) = |I(x, y) * H(x, y)||$