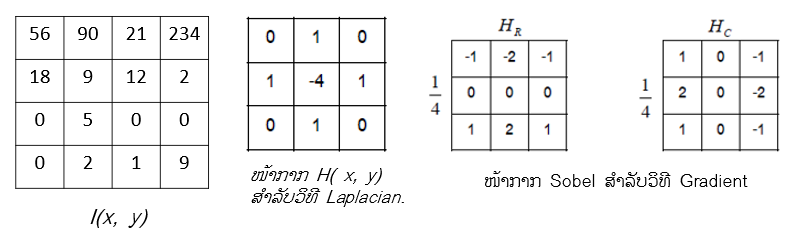
ນ ໃຈປະສົງ ວົງພັນສີ 3CS2

**ວຽກບ້ານ**

* ຈົ່ງໃຊ້ວິທີ Gradient ແລະ ວິທີ Laplacian ເພື່ອຊອກຫາພາບຂອບ ຂອງຂໍ້ມູນພາບລຸ່ມນີ້.



**ແກ້**

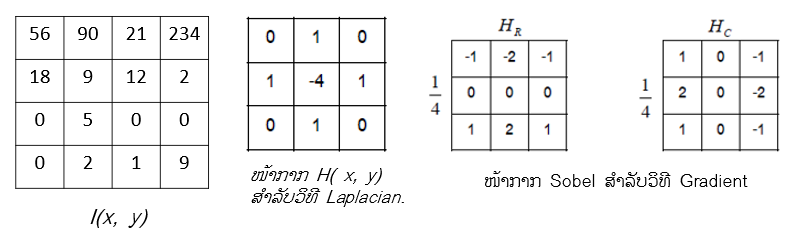
* ວິທີ Gradient ໂດຍໃຊ້ໜ້າກາກ Sobel:
* ຂັ້ນຕອນທີ 1: ຂະຫຍາຍຂອບພາບໂດຍການຕື່ມຄ່າສູນ

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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

* ຂັ້ນຕອນທີ 2: ຫາຄ່າ

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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 |



GR (1,1) = |(18x2) + (9x1)| = |36 + 9| = 11.2511

GR (1,2) =|(18x1) + (9x2) + (12 x 1)| = |18 + 18 + 12| = 12

GR (1,3) = |(9x1) + (12x2) + (2 x 1)| = |9 + 24 + 2| = 8.75

GR (1,4) = |(12x1) + (2x2)| = |12 + 4| = 4

GR (2,1) = |(56x(-2)) + (90x(-1)) + (5 x 1)| = |-112-90+5| = 49.25

GR (2,2) = |(56x(-1)) + (90x(-2)) + (21 x(- 1)) + (5x2)| = | -56 -180 -21+10 | = 61.75

GR (2,3) = |(90x(-1)) + (21x(-2)) + (234 x(- 1)) + (5x1)| =| -90-42-234+5| = 90.25

GR (2,4) = |(21x(-1)) + (234x(-2))| = | -21-468 | = 122.25

GR (3,1) = |(56x(-2)) + (90x(-1)) + (5 x 1)| = |-112-90+5| = 49.25

GR (3,2) = |(56x(-1)) + (90x(-2)) + (21 x(- 1)) + (5 x 2)| = |-56-180-21+10| = 61.75

GR (3,3) = |(90x(-1)) + (21x(-2)) + (234 x(- 1)) + (5 x 1)| = |-90-42-234+5| = 90.25

GR (3,4) = |(21x(-1)) + (234x(-2))| = |-21-468| = 122.25

GR (4,1) = |(5 x (-1)| = 1.25

GR (4,2) = |(5 x(- 2)| = 2.5

GR (4,3) = |(5 x (-1)| = 1.25

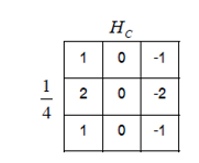
GR (4,4) = 0

ສຸດທ້າຍຈະໄດ້:

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

* ຂັ້ນຕອນທີ 3: ຫາຄ່າ 

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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 |



Gc (1,1) = |(90x(-2) + (9x(-1)| = |-180 -9| = 47.2548

Gc (1,2) =|(56x2) + (21x(-2)) + (18 x 1) x (12 x(- 1))| = |112-42+18- 12| = 19

Gc (1,3) = |(90x2) + (234x(-2) + (9 x 1) + (2 x (-1))| = |180-468 + 9-2| = 70.25

Gc (1,4) = |(21x2) + (12x1)| = |42 + 12| = 13.5

Gc (2,1) = |(90x(-1)) + (9x(-2)) + (5 x(- 1)| = |-90-18-5| = 28.25

Gc (2,2) = |(56x1) + (21 x(- 1)) + (18x2)+ (12x(-2))| = | 56 -21+36-24 | = 11.75

Gc (2,3) = |(90x1)) + (234 x(- 1)) + (9x2)+ (2x(-2)) + (5x1)| =| 90-234+18-4+5| = 31.25

Gc (2,4) = |(21x1)+ (12x2)| = | 21+24 | = 11.25

Gc (3,1) = |(9x(-1)) + (5x(-2)) + (2 x(- 1))| = |-9-10-2| = 5.25

Gc (3,2) = |(18x-1) + (12x(-1)) + (1 x(- 1))| = |-18-12-1| = 7.75

Gc (3,3) = |(9x1)+ (2x(-1)) + (5 x 2) + (2 x 1) + (9x(-1)) | = |9-2+10+2-9| = 2.5

Gc (3,4) = |(12x1) + (1x1)| = |12+1| = 3.25

Gc (4,1) = |(5 x (-1)+(2x(-2))| =|-5-4| = 2.25

Gc (4,2) = |(1 x(- 2)| = 0.5

Gc (4,3) = |(5 x 1) + (2x2) + (9x(-2)) | = 2.25

Gc (4,4) =|(1x 2)| = 0.5

ສຸດທ້າຍຈະໄດ້:

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

* ຜົນໄດ້ຮັບການຫາຂອບພາບ ໂດຍໃຊ້ວິທີGradient ໂດຍໃຊ້ໜ້າກາກ Sobel

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

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



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



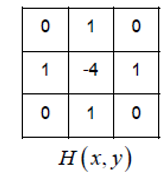
* ວິທີ Laplacian ໂດຍໃຊ້ໜ້າກາກH*(x,y*)
* ຂັ້ນຕອນທີ 1: ຂະຫຍາຍຂອບພາບໂດຍການຕື່ມຄ່າສູນ

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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 |



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

G(1,2) =

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 ໂດຍໃຊ້ໜ້າກາກH*(x,y*)

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

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



*I(x,y*)