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1) Px1 = 213, 80, 155
G = (0,299 x 213) + (0,5870 x 80) + (0,1140 x 155)
= 63,687 + 46,96 + 17,67
= 128,317

Px2 = 211, 200, 155
G = (0,299 x 211) + (0,5870 x 200) + (0,1140 x 155)
= 63,089 + 46,96 + 17,67
= 127,719

Px3 = 213, 222, 12
G = (0,299 x 213) + (0,5870 x 222) + (0,1140 x 155)
= 63,687 + 130,314 + 17,67
= 195,51

Px4 = 24, 60, 122
G = (0,2989 x 24) + (0,5870 x 60) + (0,1140 x 12)
= 7,176 + 35,22 + 13,908
= 195,51

Px5 = 153, 155, 154
G = (0,299 x 153) + (0,5870 x 155) + (0,1140 x 154)
= 45,747 + 90,985 + 17,556

Px6 = 15, 25, 155
G = (0,299 x 15) + (0,5870 x 25) + (0,1140 x 155)
= 4,485 + 14,675 + 17,67
= 96,81

Px7 = 212, 9, 19
G = (0,299 x 212) + (0,5870 x 9) + (0,1140 x 19)
= 63,388 + 5,283 + 2,166
= 69,96

Px8 = 8, 8, 100
G = (0,299 x 8) + (0,5870 x 8) + (0,1140 x 100)
= 2,392 + 4,696 + 11,4
= 19,10

VISION

2) Hitung konversi citra biner dengan threshold

Diket: T=110

1	213, 80, 155	24, 60, 122	212, 9, 19
2	211, 200, 155	153, 155, 154	8, 8, 100
3	213, 222, 155	15, 25, 155	193, 100, 123

ambil nilai intensitas dengan rumus

$I = (0,299 \times R) + (0,5870 \times G) + (0,114 \times B)$

jika I ≥ 110 Piksel maka diberi nilai 1 (putih)

jika I ≤ 110 Piksel maka diberi nilai 0 (hitam)

1) Px1 = (0, 2989 x 213) + (0, 587x 80) + (0, 1140x 155)

= 63, 6657 + 46, 96 + 17, 67

= 128, 30 ≥ 110 = 1

Px2 = 24, 60, 122

= (0, 2989 x 24) + (0, 5870 x 60) + (0, 1140 x 122)

= 7, 1736 + 35, 22 + 13, 908

= 56, 30 ≤ 110 = 0

Px3 = 212, 9, 19

= (0, 2989 x 212) + (0, 5870 x 9) + (0, 1140 x 19)

= 63, 3668 + 5, 283 + 2, 166

= 70, 82 ≤ = 0

2) Px1 = 211, 200, 155

= (0, 2989 x 211) + (0, 5870 x 200) + (0, 1140 x 155)

= 63, 1579 + 117, 47 17, 67

= 198, 23 ≥ 110 = 1

Px2 = 153, 155, 154

= (0, 2989 x 153) + (0, 5870 x 155) + (0, 1140 x 154)

= 45, 7217 + 90, 985 + 17, 556

= 153, 76 ≥ 110 = 1

Px3 = 8, 8, 100

= (0, 2989 x 8) + (0, 5870 x 8) + (0, 1140 x 100)

= 2, 3912 + 4, 696 + 11, 4

= 18, 49 ≤ 110 = 0

3) $Px_1 = 213, 222, 12$
$= (0,2989 \times 213) + (0,5870 \times 222) + (0,1140 \times 12)$
$= 63,6657 + 130,319 + 1,136$
$= 195,135 \gg 110 = 1$

$Px_3 = 143, 100, 123$
$= 42,2237 + 58,7 + 14,022$
$= 114,94 \gg 110 = 1$

$Px_2 = 15, 25, 155$
$= 4,4035 + 14,675 + 17,67$
$= 36,83 \ll 110 = 0$

Hasil akhir konveksi biner

1 0 0	→ baris pertama
1 1 0	→ kedua
1 0 1	→ ketiga

3. Index setiap pixel berdasar color palette

Color palette
warna 0 : hitam (RGB = 0, 0, 0)
warna 1 : merah (RGB = 255, 0, 0)
warna 2 : hijau (RGB = 0, 255, 0)
warna 3 : biru (RGB = 0, 0, 255)

Rumus Euclidean jarak $= \sqrt{(R_1 - R_2)^2 + (G_1 - G_2)^2 + (B_1 - B_2)^2}$

1) Piksel (1,1) = 213, 80, 155
- hitam $= \sqrt{(213-0)^2 + (80-0)^2 + (155-0)^2} = \sqrt{45369 + 6400 + 24025} = \sqrt{75794}$
$= 275,29$
- merah $= \sqrt{(213-255)^2 + (80-0)^2 + (155-0)^2} = \sqrt{1764 + 6400 + 24025} = \sqrt{32189} = 179,42$
- hijau $= \sqrt{(213-0)^2 + (80-255)^2 + (155-0)^2} = \sqrt{45369 + 30625 + 24025} = \sqrt{100019} = 316,19$
- biru $= \sqrt{(213-0)^2 + (80-0)^2 + (155-255)^2} = \sqrt{45369 + 6400 + 10000} = \sqrt{61769} = 248,54$

2) Piksel (1,2) = 24, 60, 122
- hitam $= \sqrt{(24-0)^2 + (60+0)^2 + (122+0)^2} = \sqrt{576 + 3600 + 14884} = \sqrt{19060} = 138,02$
- merah $= \sqrt{(24-255)^2 + (60+0)^2 + (122+0)^2} = \sqrt{53361 + 3600 + 14884} = \sqrt{71845} = 268,03$
- hijau $= \sqrt{(24-0)^2 + (60+255)^2 + (122+0)^2} = \sqrt{576 + 38025 + 14884} = \sqrt{53485} = 231,30$
- biru $= \sqrt{(24-0)^2 + (60+0)^2 + (122+255)^2} = \sqrt{576 + 3600 + 17689} = \sqrt{21865} = 147.85$

3) Piksel (1,3) = 212, 9, 19
- hitam = $\sqrt{(212-0)^2 + (9-0)^2 + (19-0)^2} = \sqrt{44944 + 81 + 361} = \sqrt{45386} = 213,14$
- merah = $\sqrt{(212-255)^2 + (9-0)^2 + (19-0)^2} = \sqrt{1849 + 81 + 361} = \sqrt{2291} = 47,87$
- hijau = $\sqrt{(212-0)^2 + (9-255)^2 + (19-0)^2} = \sqrt{44944 + 60516 + 361} = \sqrt{105821} = 325,32$
- biru = $\sqrt{(212-0)^2 + (9-0)^2 + (19-255)^2} = 44944 + 81 + 55696 = \sqrt{100721} = 317,42$

4) Piksel (2,1) = 211, 200, 155
- hitam = $\sqrt{(211-0)^2 + (200-0)^2 + (155-0)^2} = \sqrt{44521 + 40000 + 24025} = 329,98$
- merah = $\sqrt{(211-255)^2 + (200-0)^2 + (155-0)^2} = \sqrt{1936 + 40000 + 24025} = 256,92$
- hijau = $\sqrt{(211-0)^2 + (200-255)^2 + (155-0)^2} = \sqrt{44521 + 3025 + 24025} = 267,62$
- biru = $\sqrt{(211-0)^2 + (200-0)^2 + (155-255)^2} = \sqrt{44521 + 40000 + 10000} = 302,99$

5) Piksel (2,2) = (153, 155, 154)
- hitam = $\sqrt{(153-0)^2 + (155-0)^2 + (154-0)} = \sqrt{23409 + 24025 + 23716} = 329,98$
- merah = $\sqrt{(153-255)^2 + (155-0)^2 + (154-0)} = \sqrt{10404 + 24025 + 23716} = 256,92$
- hijau = $\sqrt{(153-0)^2 + (155-255)^2 + (154-0)} = \sqrt{23409 + 10000 + 23716} = 267,62$
- Biru = $\sqrt{(153-0)^2 + (155-0)^2 + (154-255)^2} = \sqrt{23409 + 24025 + 10201} = 302,99$

6) Piksel (2,3) = 0, 8, 100
- hitam = $\sqrt{(0-0)^2 + (8-0)^2 + (100-0)^2} = \sqrt{64 + 64 + 10000} = \sqrt{10128} = 100,64$
- merah = $\sqrt{(0-255)^2 + (8-0)^2 + (100-0)^2} = \sqrt{61009 + 64 + 10000} = \sqrt{71073} = 266,61$
- hijau = $\sqrt{(0-0)^2 + (8-255)^2 + (100-0)^2} = \sqrt{64 + 61009 + 10000} = \sqrt{71073} = 266,61$
- biru = $\sqrt{(0-0)^2 + (8-0)^2 + (100-255)^2} = \sqrt{64 + 64 + 24025} = \sqrt{24153} = 155,47$

7) Piksel (3,1) = 213, 222, 12
- hitam = $\sqrt{(213-0)^2 + (222-0)^2 + (12-0)^2} = \sqrt{45369 + 49284 + 144} = \sqrt{94797} = 307,93$
- merah = $\sqrt{(213-255)^2 + (222-0)^2 + (12-0)^2} = \sqrt{1764 + 49284 + 144} = \sqrt{51252} = 226,38$
- hijau = $\sqrt{(213-0)^2 + (222-255)^2 + (12-0)^2} = \sqrt{45369 + 1089 + 144} = \sqrt{46602} = 215,96$
- biru = $\sqrt{(213-0)^2 + (222-0)^2 + (12-255)^2} = \sqrt{45369 + 49284 + 59049} = \sqrt{153702} = 392,03$

8) Piksel (3,2) = 15, 25, 155
- hitam = $\sqrt{(15-0)^2 + (25-0)^2 + (155-0)^2} = \sqrt{225 + 625 + 24025} = \sqrt{24875} = 157,76$
- merah = $\sqrt{(15-255)^2 + (25-0)^2 + (155-0)^2} = \sqrt{57600 + 625 + 24025} = \sqrt{82250} = 286,87$
- hijau = $\sqrt{(15-0)^2 + (25-255)^2 + (155-0)^2} = \sqrt{225 + 52900 + 24025} = \sqrt{77150} = 277,75$
- biru = $\sqrt{(15-0)^2 + (25-0)^2 + (155-255)^2} = \sqrt{225 + 625 + 10000} = \sqrt{10850} = 104,15$

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Date :

g) piksel (3,3) = 143, 100, 123

- hitam = $(143-0)^2+(100-0)^2+(123-0)^2 = \sqrt{20449+10000+15129} = 213,59$
- merah = $(143-255)^2+(100-0)^2+(123-0)^2 = \sqrt{12544+10000+15129} = 194,12$
- hijau = $(143-0)^2+(100-255)^2+(123-0)^2 = \sqrt{20449+24025+15129} = 293,47$
- biru = $(143-0)^2+(100-0)^2+(123-255)^2 = \sqrt{20449+10000+17424} = 218,78$

hasil akhir

- piksel

(1,1) = merah (2,1) = merah (3,1)

(1,2) = ~~hitam~~ ~~merah~~ ~~hijau~~ (2,2) = hijau (3,2)

(1,3) = ~~merah~~ merah ~~biru~~ (2,3) = hitam (3,3)

hasil piksel citra

255,0,0	0,0,0	255,0,0
255,0,0	0,255,0	0,0,0
0,255,0	0,0,255	255,0,0