Aivars Lorencs

Pilsētu tālizpētes datu sapludināšanas algoritma veidošana pēc datu apstrādes divpakāpju principa

VPP projekta Nr.4 "GUDPILS" seminārs
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Spektra joslas:

[4; 14; 26; 36; 47; 57; 69; 78]

$$\boldsymbol{\mu}_k = \frac{1}{n_k} \sum_{\nu=1}^{n_k} x_\nu$$

$$\boldsymbol{\Sigma}_k = \frac{1}{n_k - 1} \sum_{\nu=1}^{n_k} \left(\mathbf{x}_\nu - \boldsymbol{\mu}_k \right) \cdot \left(\mathbf{x}_\nu - \boldsymbol{\mu}_k \right)^T$$

$$f_k\left(\mathbf{x}\right) = \left(2\pi\right)^{-3/2} \left|\boldsymbol{\Sigma}_k\right|^{-1/2} \exp\left(-\frac{1}{2} \left(\mathbf{x} - \boldsymbol{\mu}_k \right)^T \boldsymbol{\Sigma}_k^{-1} \left(\mathbf{x} - \boldsymbol{\mu}_k \right) \right)$$

$$g_k\left(\mathbf{y}\right) = \left(2\pi\right)^{-8/2} \left|\boldsymbol{\Sigma}'_k\right|^{-1/2} \exp\left(-\frac{1}{2} \left(\mathbf{y} - \boldsymbol{\mu}'_k \right)^T \left(\boldsymbol{\Sigma}'_k \right)^{-1} \left(\mathbf{y} - \boldsymbol{\mu}'_k \right) \right)$$

K: $f_k(\mathbf{x}) / f_j(\mathbf{x}) \geq 1$ $j \neq k$ $\ln\left(f_k(\mathbf{x})\right) - \ln\left(f_j(\mathbf{x})\right) > 0$

K': $g_k(\mathbf{y}) / g_j(\mathbf{y}) \geq 1$ $j \neq k$ $\ln\left(g_k(\mathbf{y})\right) - \ln\left(g_j(\mathbf{y})\right) > 0$

4. pārlidojums – dizaina kopa

Dizaina klases vidējās vērtības vektori RGB attēlam			
	R	G	B
μ1	160	156	174
μ2	80	95	63
μ3	153	118	121
μ4	126	131	149
μ5	254	254	254
μ6	100	105	85
μ7	199	169	158

Dizaina klases kovariācijmatricas RGB attēlam

Σ1

598.0417	571.7014	620.0480
571.7014	560.3220	614.8983
620.0480	614.8983	691.1808

Σ2

469.1996	515.6839	248.4144
515.6839	604.7016	265.4280
248.4144	265.4280	169.3080

Σ3

1.0e+03 *

2.4977	1.8482	1.4752
1.8482	1.5185	1.2615
1.4752	1.2615	1.1063

Σ4

1.0e+03 *

3.0850	3.0390	3.0150
3.0390	3.0883	3.0705
3.0150	3.0705	3.1075

Σ5

53.3092	49.0035	35.0579
49.0035	48.8115	35.5028
35.0579	35.5028	28.5779

Σ6

408.4091	282.5815	268.4593
282.5815	225.1762	192.3765
268.4593	192.3765	190.6803

Σ7

714.0569	587.8455	625.1510
587.8455	516.6992	555.3744
625.1510	555.3744	654.4080

3. pārlidojums – testa kopa

II . pakāpē vidējās vērtības vektori RGB attēlam			
	R	G	B
μ1	179	175	194
μ2	69	82	60
μ3	163	117	115
μ4	165	164	182
μ5	254	254	254
μ6	84	94	75

II. pakāpē kovariācijmatricas RGB attēlam

Σ1

664.9060	630.7200	675.6116
630.7200	607.6928	656.2772
675.6116	656.2772	719.9850

Σ2

393.3486	444.0021	168.7864
444.0021	535.0439	184.2891
168.7864	184.2891	96.3349

Σ3

1.0e+03 *

2.0182	1.2591	0.9547
1.2591	1.0588	0.8495
0.9547	0.8495	0.7038

Σ4

1.0e+03 *

4.9998	4.8095	4.8154
4.8095	4.6546	4.6674
4.8154	4.6674	4.7173

Σ5

4.5937	3.5767	1.8910
3.5767	4.2447	1.9626
1.8910	1.9626	2.0807

Σ6

199.4812	150.0327	124.8510
150.0327	147.1625	106.4532
124.8510	106.4532	91.7365

Klasifikācijas precizitāte

Dizaina kopai: **0.81**

Testa kopai I.pakāpe: **0.80**

Testa kopai II.pakāpe: **0.79**

U: $$\ln\left(f_k^*(\mathbf{x})\right)+\ln\left(g_k^*(\mathbf{y}_a)\right)-\ln\left(f_j^*(\mathbf{x})\right)+\ln\left(g_j^*(\mathbf{y}_a)\right)\geq 0$$