Classes and weights

$\mathbb{C} = \{c_{i=1}, \ldots, c_{i=I}\}; \Theta = \{0, 0.5, 1\}$

Primary data

$$L_P = \begin{bmatrix} q_{1,1} & q_{1,2} & \cdots & & q_{1,m} \\ q_{2,1} & q_{2,2} & \cdots & & q_{2,m} \\ \vdots & & & & \vdots \\ q_{j,1} & q_{j,2} & \cdots & & q_{j,m} \end{bmatrix} ; \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_j \end{bmatrix} ; k_P$$

Auxiliary data

$$L_A = \begin{bmatrix} b_{1,1} & b_{1,2} & \cdots & \cdots & b_{1,n} \\ b_{2,1} & b_{2,2} & \cdots & \cdots & b_{2,n} \\ \vdots & & & & \vdots \\ b_{j,1} & b_{j,2} & \cdots & \cdots & b_{j,n} \end{bmatrix} ; \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_j \end{bmatrix} ; k_A$$

Neighbour matrices

$$N_P = \begin{matrix} c_{i=1} & \cdots & c_{i=I} \\ \begin{bmatrix} n^P_{1,1} & \cdots & n^P_{1,I} \\ n^P_{2,1} & \cdots & n^P_{2,I} \\ \vdots & & \vdots \end{bmatrix} \end{matrix} ; N_A = \begin{matrix} c_{i=1} & \cdots & c_{i=I} \\ \begin{bmatrix} n^A_{1,1} & \cdots & n^A_{1,I} \\ n^A_{2,1} & \cdots & n^A_{2,I} \\ \vdots & & \vdots \end{bmatrix} \end{matrix}$$

Classes and weights

$\mathbb{C} = \{c_{i=1}, \ldots, c_{i=l}\}; \Theta = \{0, 0.5, 1\}$

Primary data

$$L_P = \begin{bmatrix} q_{1,1} & q_{1,2} & \cdots & q_{1,m} \\ q_{2,1} & q_{2,2} & \cdots & q_{2,m} \\ \vdots & & & \vdots \\ q_{j,1} & q_{j,2} & \cdots & q_{j,m} \end{bmatrix} \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_j \end{bmatrix}; k_P$$

Auxiliary data

$$L_A = \begin{bmatrix} b_{1,1} & b_{1,2} & \cdots & \cdots & b_{1,n} \\ b_{2,1} & b_{2,2} & \cdots & \cdots & b_{2,n} \\ \vdots & & & & \vdots \\ b_{j,1} & b_{j,2} & \cdots & \cdots & b_{j,n} \end{bmatrix} \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_j \end{bmatrix}; k_A$$

Neighbour matrices

$$N_P = \begin{bmatrix} c_{i=1} & \cdots & c_{i=l} \\ n_{1,1}^P & \cdots & n_{1,l}^P \\ n_{2,1}^P & \cdots & n_{2,l}^P \\ \vdots & & \vdots \end{bmatrix}; N_A = \begin{bmatrix} c_{i=1} & \cdots & c_{i=l} \\ n_{1,1}^A & \cdots & n_{1,l}^A \\ n_{2,1}^A & \cdots & n_{2,l}^A \\ \vdots & & \vdots \end{bmatrix}$$

$$N_P = \begin{array}{c} \\ p_1 \\ p_2 \\ \\ \end{array} \begin{array}{ccc} c_1 & c_2 & c_3 \\ \end{array} \begin{bmatrix} \frac{3}{3} & 0 & 0 \\ \frac{1}{3} & \frac{2}{3} & 0 \\ \vdots & \vdots & \vdots \end{bmatrix}$$

Classes and weights

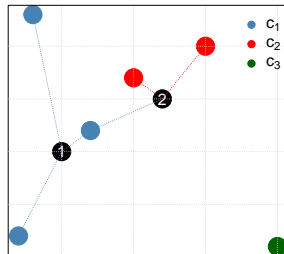$\mathbb{C} = \{c_{i=1}, \dots, c_{i=l}\}; \Theta = \{0, 0.5, 1\}$

Primary data

$$L_P = \begin{bmatrix} q_{1,1} & q_{1,2} & \dots & q_{1,m} \\ q_{2,1} & q_{2,2} & \dots & q_{2,m} \\ \vdots & & & \vdots \\ q_{j,1} & q_{j,2} & \dots & q_{j,m} \end{bmatrix} \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_j \end{bmatrix}; k_P$$

Auxiliary data

$$L_A = \begin{bmatrix} b_{1,1} & b_{1,2} & \dots & \dots & b_{1,n} \\ b_{2,1} & b_{2,2} & \dots & \dots & b_{2,n} \\ \vdots & & & & \vdots \\ b_{j,1} & b_{j,2} & \dots & \dots & b_{j,n} \end{bmatrix} \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_j \end{bmatrix}; k_A$$

Neighbour matrices

$$N_P = \begin{bmatrix} c_{i=1} & \dots & c_{i=l} \\ n_{1,1}^P & \dots & n_{1,l}^P \\ n_{2,1}^P & \dots & n_{2,l}^P \\ \vdots & & \vdots \end{bmatrix}; N_A = \begin{bmatrix} c_{i=1} & \dots & c_{i=l} \\ n_{1,1}^A & \dots & n_{1,l}^A \\ n_{2,1}^A & \dots & n_{2,l}^A \\ \vdots & & \vdots \end{bmatrix}$$

Weights matrix (labelled)

$$\begin{array}{c} \\ \theta_1 \\ \theta_2 \\ \theta_i \\ \vdots \\ \theta_{\Theta^l} \end{array} \begin{array}{ccc} c_1 & c_2 & c_3 \\ \end{array} \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 1 \\ \vdots & & \vdots \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} F_{1_1} \\ F_{1_2} \\ F_{1_i} \\ \vdots \\ F_{1_{\Theta^l}} \end{bmatrix}$$

$$\theta^* = \{1, 0, 1\}$$

($\heartsuit$ BiocParallel)

Classes and weights

$\mathbb{C} = \{c_{i=1}, \ldots, c_{i=l}\}; \Theta = \{0, 0.5, 1\}$

Primary data

$$L_P = \begin{bmatrix} q_{1,1} & q_{1,2} & \cdots & q_{1,m} \\ q_{2,1} & q_{2,2} & \cdots & q_{2,m} \\ \vdots & & & \vdots \\ q_{j,1} & q_{j,2} & \cdots & q_{j,m} \end{bmatrix} \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_j \end{bmatrix}; k_P$$

Auxiliary data

$$L_A = \begin{bmatrix} b_{1,1} & b_{1,2} & \cdots & \cdots & b_{1,n} \\ b_{2,1} & b_{2,2} & \cdots & \cdots & b_{2,n} \\ \vdots & & & & \vdots \\ b_{j,1} & b_{j,2} & \cdots & \cdots & b_{j,n} \end{bmatrix} \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_j \end{bmatrix}; k_A$$

Neighbour matrices

$$N_P = \begin{matrix} c_{i=1} & \cdots & c_{i=l} \end{matrix} \\ \begin{bmatrix} n_{1,1}^P & \cdots & n_{1,l}^P \\ n_{2,1}^P & \cdots & n_{2,l}^P \\ \vdots & & \vdots \end{bmatrix}; N_A = \begin{matrix} c_{i=1} & \cdots & c_{i=l} \end{matrix} \\ \begin{bmatrix} n_{1,1}^A & \cdots & n_{1,l}^A \\ n_{2,1}^A & \cdots & n_{2,l}^A \\ \vdots & & \vdots \end{bmatrix}$$

Class-weighted classifier (unlabelled)

$$V(c_i)_j = \theta^* n_{ij}^P + (1 - \theta^*) n_{ij}^A$$

$$\begin{matrix} c_{i=1} & \cdots & c_{i=l} \end{matrix}$$
$$\begin{matrix} 1 \\ 2 \\ 3 \\ \vdots \\ j \end{matrix} \begin{bmatrix} & & \\ & & \\ & V(c_i)_j & \\ & & \\ & & \end{bmatrix}$$

$$y_j = argmax(V(c_i)_j)$$