Classes and weights

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

Primary data and auxiliary data

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

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

Neighbour matrices

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

Weights matrix

$$
\theta = \begin{array}{c} \\ \theta_1 \\ \theta_2 \\ \theta_i \\ \vdots \\ \theta_{\Theta^l} \end{array} \begin{array}{c} \begin{matrix} c_{i=1} & \cdots & c_{i=l} \end{matrix} \\ \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 1 \\ \vdots & & \vdots \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} \end{array} \begin{bmatrix} F_{1_1} \\ F_{1_2} \\ F_{1_i} \\ \vdots \\ F_{1_{\Theta^l}} \end{bmatrix}
$$

Class-weighted classifier

$$
V = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ \vdots \\ j \end{array} \begin{array}{c} \begin{matrix} c_{i=1} & \cdots & c_{i=l} \end{matrix} \\ \begin{bmatrix} & & \\ & V(c_i)_j = \theta_i n_{ij}^P + (1 - \theta_i) n_{ij}^A & \\ & & \end{bmatrix} \end{array} \quad y_j = argmax(V(c_i)_j)
$$