

**Require:** Dataset<sup>1</sup>, Preprocessing<sup>1</sup>, D, cmax, Criterion, Variables<sup>1</sup>, pdf<sup>1</sup>, Theta1<sup>1</sup>, Theta2, K<sup>1</sup>, y0, ymin, ymax, ar and Restraints.

**Ensure:** Dataset contains datasets, Preprocessing is one of "histogram", "Parzen window" or "k-nearest neighbour",  $0 \leq D \leq 1$ ,  $c_{\max} \in \mathbb{N}$ , Criterion is one of "AIC", "AIC3", "AIC4", "AICc", "BIC", "CAIC", "HQC", "MDL2", "MDL5", "AWE", "CLC", "ICL", "PC", "ICL-BIC", "D" or "SSE", Variables are "continuous" or "discrete", pdf is one of "normal", "lognormal", "Weibull", "gamma", "binomial", "Poisson" or "Dirac", Theta1 may contain initial binomial parameters, Theta2 is inactive,  $K \subset \mathbb{N}$ , y0 may contain origins, ymin and ymax may contain minimum and maximum observations,  $0 < ar \leq 1$  and Restraints are "loose" or "rigid".

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1: for all  $v$  such that  $v \in K$  do
2:   Preprocessing of observations
3:    $I_1 \leftarrow 1$ ,  $D_{\min} \leftarrow 0.25$ ,  $k_{lj} \leftarrow k_j$  for  $j = 1$  to  $v$ 
4:   repeat
5:      $l \leftarrow 1$ ,  $r \leftarrow n$ ,  $n_l \leftarrow n$ 
6:     while  $n_l/n > 2D_{\min}(l-1)$  do
7:       Global mode detection
8:        $I_2 \leftarrow 1$ ,  $w_l \leftarrow n_l/n$ ,  $r_j \leftarrow 0$  for  $j = 1$  to  $v$ 
9:       while  $I_2 \leq I_{\max}$  do
10:        Rough component parameter estimation
11:         $e_{lp} \leftarrow 0$ ,  $e_{ln} \leftarrow 0$ ,  $e_{l\max} \leftarrow 0$ 
12:        for  $j = 1$  to  $v$  do
13:           $e_{lj} \leftarrow 0$ ,  $\varepsilon_{lj} \leftarrow 0$ 
14:          if  $k_{lj} > 0$  or  $r_j > 0$  then
15:             $e_{lj} \leftarrow k_{lj} - n_l f(\bar{y}_j | \theta_l) V_j$ 
16:            if  $e_{lj} > 0$  then
17:               $\varepsilon_{lj} \leftarrow e_{lj}/k_{lj}$ ,  $\varepsilon_{l\max} \leftarrow \max\{\varepsilon_{l\max}, \varepsilon_{lj}\}$ ,  $e_{lp} \leftarrow e_{lp} + e_{lj}$ 
18:            else
19:               $e_{lj} \leftarrow \max\{e_{lj}, -r_j\}$ ,  $e_{ln} \leftarrow e_{ln} - e_{lj}$ 
20:            end if
21:          end if
22:        end for
23:         $D_l \leftarrow e_{lp}/n_l$ ,  $\varepsilon_{l\max} \leftarrow \varepsilon_{l\max}(1 - ar)$ 
24:        if  $D_l > D_{\min}/w_l$  then
25:          for all  $j$  such that  $1 \leq j \leq v$  and  $\varepsilon_{lj} > \varepsilon_{l\max}$  do
26:             $k_{lj} \leftarrow k_{lj} - e_{lj}$ ,  $r_j \leftarrow r_j + e_{lj}$ ,  $n_l \leftarrow n_l - e_{lj}$ 
27:          end for
28:           $e_{lp} \leftarrow e_{lp}/D_l - n_l$ ,  $f \leftarrow e_{lp}/e_{ln}$  if  $e_{ln} > e_{lp}$  otherwise  $f \leftarrow 1$ 
29:          for all  $j$  such that  $1 \leq j \leq v$  and  $e_{lj} < 0$  do
30:             $e_{lj} \leftarrow f e_{lj}$ ,  $k_{lj} \leftarrow k_{lj} - e_{lj}$ ,  $r_j \leftarrow r_j + e_{lj}$ ,  $n_l \leftarrow n_l - e_{lj}$ 
31:          end for
32:           $w_l \leftarrow n_l/n$ 
33:        else
34:          Enhanced component parameter estimation, break
35:        end if
36:         $I_2 \leftarrow I_2 + 1$ 
37:      end while
38:      First and second moment calculation
39:       $c \leftarrow l$ ,  $r \leftarrow r - n_l$ ,  $l \leftarrow l + 1$ ,  $n_l \leftarrow r$ ,  $k_{lj} \leftarrow r_j$  for  $j = 1$  to  $v$ 
40:      Stop  $\leftarrow c \geq v$  or  $c \geq c_{\max}$ , break if Stop = true
41:    end while
42:    Bayes classification of the remaining observations, log likelihood  $\log L$ , information criterion IC and total of positive relative deviations  $D$  calculation
43:    if  $IC < IC_{\text{opt}}$  then
44:       $\log L \rightarrow \log L_{\text{opt}}$ ,  $IC \rightarrow IC_{\text{opt}}$ ,  $c \rightarrow c_{\text{opt}}$ ,  $w \rightarrow w_{\text{opt}}$ ,  $\Theta \rightarrow \Theta_{\text{opt}}$ 
45:    end if
46:    Stop  $\leftarrow$  Stop or  $D \leq D$  or  $I_1 \geq I_{\max}$ ,  $D_{\min} \leftarrow cD_{\min}/(c+1)$ ,  $I_1 \leftarrow I_1 + 1$ 
47:  until Stop = true
48: end for

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