Require: Dataset[1], Preprocessing[1], cmax, Criterion, Variables[1], pdf[1], Theta1[1], Theta2, K[1], y0, ymin, ymax, ar and Restraints.

Ensure: Dataset contains datasets, Preprocessing is one of "histogram", "Parzen window" or "k-nearest neighbour", cmax $\in$ $\mathbb{N}$, 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 ≤ 1 and Restraints are "loose" or "rigid".

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:    **while** $I_1 \leq I_{\max}$ **do**
5:      $l \leftarrow 1$, $r \leftarrow n$, $n_l \leftarrow n$
6:      **while** $n_l/n > D_{\min}(l-1)$ **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:          $e_{l\mathrm{p}} \leftarrow 0$, $e_{l\mathrm{n}} \leftarrow 0$, $e_{l\max} \leftarrow 0$
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:              $e_{lj} \leftarrow k_{lj} - n_l f(\bar{\boldsymbol{y}}_j | \boldsymbol{\theta}_l) V_j$
16:              **if** $e_{lj} > 0$ **then**
17:                $\varepsilon_{lj} \leftarrow e_{lj}/k_{lj}$, $\varepsilon_{l\max} \leftarrow \max\{\varepsilon_{l\max}, \varepsilon_{lj}\}$, $e_{l\mathrm{p}} \leftarrow e_{l\mathrm{p}} + e_{lj}$
18:              **else**
19:                $e_{lj} \leftarrow \max\{e_{lj}, -r_j\}$, $e_{l\mathrm{n}} \leftarrow e_{l\mathrm{n}} - e_{lj}$
20:              **end if**
21:            **end if**
22:          **end for**
23:          $D_l \leftarrow e_{l\mathrm{p}}/n_l$, $\varepsilon_{l\max} \leftarrow \varepsilon_{l\max}(1 - \mathrm{ar})$
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:            $e_{l\mathrm{p}} \leftarrow e_{l\mathrm{p}}/D_l - n_l$, $f \leftarrow e_{l\mathrm{p}}/e_{l\mathrm{n}}$ if $e_{l\mathrm{n}} > e_{l\mathrm{p}}$ 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 $c \geq$ cmax, **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$_{\mathrm{opt}}$ **then**
44:        $\log L \rightarrow \log L_{\mathrm{opt}}$, IC $\rightarrow$ IC$_{\mathrm{opt}}$, $c \rightarrow c_{\mathrm{opt}}$, $\boldsymbol{w} \rightarrow \boldsymbol{w}_{\mathrm{opt}}$, $\boldsymbol{\Theta} \rightarrow \boldsymbol{\Theta}_{\mathrm{opt}}$
45:      **end if**
46:      **break** if Stop = **true**, $D_{\min} \leftarrow c D_{\min}/(c+1)$, $I_1 \leftarrow I_1 + 1$
47:    **end while**
48: **end for**