

**input** : Association weights  $w^{i,a} \triangleq w_{t|t}^{i,a} \forall i \in \{1, \dots, n_{t|t-1}\}, a \in \{0, \dots, m_t\}$ ,  
false alarm/new target intensity  
 $w^{0,j} \triangleq w_{t|t}^{n_{t|t-1}+j,1} \forall j \in \{1, \dots, m_t\}$ ,  
convergence threshold  $\epsilon \ll 1$

**output**: Approximate marginal probabilities  $\tilde{p}^i(a)$

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1   $\mu_{bj \rightarrow a^i} := 1 \forall i \in \{1, \dots, n_{t|t-1}\}, j \in \{1, \dots, m_t\}$ 
2   $\tilde{\mu}_{bj \rightarrow a^i} := 0 \forall i \in \{1, \dots, n_{t|t-1}\}, j \in \{1, \dots, m_t\}$ 
3  Run LBP iteration
4  while  $\max_{i,j} |\mu_{bj \rightarrow a^i} - \tilde{\mu}_{bj \rightarrow a^i}| > \epsilon$  do
5       $\tilde{\mu}_{bj \rightarrow a^i} := \mu_{bj \rightarrow a^i} \forall i, j$ 
6      for  $i \in \{1, \dots, n_{t|t-1}\}$  do
7           $s := w^{i,0} + \sum_{j=1}^{m_t} w^{i,j} \mu_{bj \rightarrow a^i}$ 
8           $\mu_{a^i \rightarrow bj} := \frac{w^{i,j}}{s - w^{i,j} \mu_{bj \rightarrow a^i}} \forall j \in \{1, \dots, m_t\}$ 
9      end
10     for  $j \in \{1, \dots, m_t\}$  do
11          $s := w^{0,j} + \sum_{i=1}^{n_{t|t-1}} \mu_{a^i \rightarrow bj}$ 
12          $\mu_{bj \rightarrow a^i} := \frac{1}{s - \mu_{a^i \rightarrow bj}} \forall i \in \{1, \dots, n_{t|t-1}\}$ 
13     end
14 end
15 Calculate outputs—for existing tracks and then new tracks
16 for  $i \in \{1, \dots, n_{t|t-1}\}$  do
17      $s := w^{i,0} + \sum_{j=1}^{m_t} w^{i,j} \mu_{bj \rightarrow a^i}$ 
18      $\tilde{p}^i(0) := w^{i,0}/s$ 
19      $\tilde{p}^i(j) := w^{i,j} \mu_{bj \rightarrow a^i} / s \forall j \in \{1, \dots, m_t\}$ 
20 end
21 for  $j \in \{1, \dots, m_t\}$  do
22      $s := w^{0,j} + \sum_{i=1}^{n_{t|t-1}} \mu_{a^i \rightarrow bj}$ 
23      $\tilde{p}^{n_{t|t-1}+j}(1) := w^{0,j} / s$ 
24 end

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