About the EM algorithm in HMM of two case: discrete and continuous

<table>
<tr><th>Discrete case</th><th>Continuous case</th></tr>
<tr><td colspan="2">$a_{ij} \leftarrow \text{transProbs[i, j]}$</td></tr>
<tr><td>$b_i(k) = \text{emissionProbs[i, k]}$</td><td>$b_i(k) = \mathcal{N}(\mu_i, \sigma_i)\Big|_{X=k}$</td></tr>
<tr><td colspan="2">$$\forall t, i; \quad \alpha_t(i) = \left[\sum_{j=0}^{N-1} \alpha_{t-1}(j) \cdot a_{ji}\right] \cdot b_i(\mathcal{O}_t)$$</td></tr>
<tr><td colspan="2">$$\forall t, i; \quad \beta_t(i) = \sum_{j=0}^{N-1} a_{ji} \cdot b_j(\mathcal{O}_{t+1}) \cdot \beta_{t+1}(j)$$</td></tr>
<tr><td colspan="2">$$\forall t, i; \quad \tilde{\gamma}_t(i) = \alpha_t(i) \cdot \beta_t(i)$$ $$\forall t; \quad \text{denom}_t = \sum_{i=0}^{N-1} \tilde{\gamma}_t(i)$$</td></tr>
<tr><td colspan="2">$$\forall t, i; \quad \gamma_t(i) = \tilde{\gamma}_t(i) \Big/ \text{denom}_t$$</td></tr>
<tr><td colspan="2">$$\forall t, i; \quad \tilde{\xi}_t(i, j) = \alpha_t(i) \cdot a_{ij} \cdot \beta_{t+1}(j) \cdot b_j(\mathcal{O}_{t+1})$$ $$\forall t, i; \quad \xi_t(i, j) = \tilde{\xi}_t(i, j) \Big/ \text{denom}_t$$</td></tr>
<tr><td colspan="2">$$\forall i; \quad n_i = \sum_{t=0}^{T-1} \gamma_t(i)$$</td></tr>
<tr><td colspan="2">$$\forall i, j; \quad a_{ij}{}^{+} \leftarrow \sum_{t=1}^{T-1} \xi_t(i, j) \Bigg/ n_i$$</td></tr>
<tr><td>$$\forall i, k; \quad b_i(k) \leftarrow \sum_{t \,/\, \mathcal{O}_t = k} \gamma_t(i) \Bigg/ n_i$$</td><td>$$\forall i; \quad \mu_i \leftarrow \sum_t \left[\gamma_t(i) \cdot \mathcal{O}_t\right] \Bigg/ n_i$$ $$\forall i, \quad \sigma_i^2 \leftarrow \sum_t \left[\gamma_t(i) \cdot (\mathcal{O}_t - \mu_i)^2\right] \Bigg/ n_i$$ $$= \sum_t \left[\gamma_t(i) \cdot \mathcal{O}_t{}^2\right] \Bigg/ n_i \; - \mu_i{}^2$$</td></tr>
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