i is different for each resolution and requires different models for each resolution

 $P(x) = \sum_{j=1}^{J} \pi_j P(x|\theta_j) = \sum_{j=1}^{J} \pi_j \prod_{i=1}^{d} \theta_{ji}^{x_i} (1 - \theta_{ji})^{1-x_i}$