**Algorithm**

1. Initialisation

P (r0 = 0) = 1

1. For all data xt
   1. For rt = 0 (changepoint probability)
      1. Calculate likelihood with the current data and
      2. Log (joint probability for this point) = Sum over all the points in the previous time step:
         1. Add the log(joint probability) + log(likelihood) + log(prior probability of change)
   2. For all the other possible rt (growth probabilities)
      1. Update the sufficient statistics
      2. Calculating likelihood with the current data and updated sufficient statistics
      3. Log (joint probability for this point) = Joint of the previous point + log(likelihood) + log(prior probability of not having change)
2. Get the point with maximum joint probability at each time step

**Log Likelihood**

Where n is the data +alpha, m is the current sufficient statistics and ni are the counts in the current document.