

1 Algorithm

Algorithm 1 MPS within hamming distance k

Input: a probabilistic automaton \mathcal{M} , a string w , and a distance limit k

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1:  $n \leftarrow |w|$ 
2:  $\mathbb{M}_\lambda \leftarrow \mathbb{I}_{|Q| \times |Q|}$ 
3:  $prefix(i) \leftarrow \begin{cases} \mathbb{I}, & \text{if } i = 0 \\ \mathbb{I}\mathbb{M}_{w_1 \dots w_i}, & \text{if } 1 \leq i \leq n \end{cases}$ 
4:  $suffix(i) \leftarrow \begin{cases} \mathbb{F}, & \text{if } i = n + 1 \\ \mathbb{M}_{w_i \dots w_n} \mathbb{F}, & \text{if } 1 \leq i \leq n \end{cases}$ 
5:  $infix(i, j) \leftarrow \begin{cases} \mathbb{M}_{w_i} \dots \mathbb{M}_{w_j}, & \text{if } 1 \leq i \leq j \leq n \\ \mathbb{I}_{|Q| \times |Q|}, & \text{if } i > j \end{cases}$ 
6:  $w^* \leftarrow \lambda$ 
7:  $p^* \leftarrow 0$ 
8: for each  $k$ -combination  $\sigma$  of  $n$  do
9:   for each  $(c_1, \dots, c_k) \in \Sigma^k$  do
10:     $w' \leftarrow$  a string obtained by replacing  $w_{\sigma(i)}$  by  $c_i$  for all  $1 \leq i \leq k$ 
11:     $p(w') \leftarrow prefix(\sigma(1) - 1)$ 
12:    for  $i \leftarrow 1, \dots, k$  do
13:       $p(w') \leftarrow p(w') \mathbb{M}_{c_i} infix(\sigma(i) + 1, \sigma(i + 1) - 1)$ 
14:     $p(w') \leftarrow p(w') \mathbb{M}_{c_n} suffix(\sigma(n) + 1)$ 
15:    if  $p^* < p(w')$  then
16:       $w^* \leftarrow w'$ 
17:       $p^* \leftarrow p(w')$ 
18: return  $w^*$ 

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