

Input: Set of sources ϕ_{E_j} , set of entities σ_{E_j} from the event dictionary, threshold for convergence μ .

Output: Ordered set of sources φ_{E_j} , ranked according to their ‘specificity’ scores w.r.t E_j , and, ordered set of entities ς_{E_j} , ranked according to their ‘closeness’ scores w.r.t E_j .

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1 Initialize  $\kappa_{E_j(0)} \leftarrow \tau_{E_j(0)} \leftarrow \langle 1, 1, \dots, 1 \rangle$ ;  
2 Initialize  $k \leftarrow 1$  ;  
3 repeat  
4   Construct matrices  $L_{k-1}$  and  $L_{k-1}^T$ ;  
5   Calculate matrix products  $M \leftarrow L_{k-1} L_{k-1}^T$  and  $M'' \leftarrow L_{k-1}^T L_{k-1}$ ;  
6   Convert  $M$  and  $M''$  into stochastic matrices  
    $M_{stochastic} \leftarrow M$  and  $M''_{stochastic} \leftarrow M''$  ;  
7    $\kappa_{E_j}(k) \leftarrow M_{stochastic} \kappa_{E_j}(k-1)$  ;  
8    $\tau_{E_j}(k) \leftarrow M''_{stochastic} \tau_{E_j}(k-1)$  ;  
9   normalize  $\kappa_{E_j}(k) \leftarrow \frac{\kappa_{E_j}(k)}{\|\kappa_{E_j}(k)\|_1}$  ;  
10  normalize  $\tau_{E_j}(k) \leftarrow \frac{\tau_{E_j}(k)}{\|\tau_{E_j}(k)\|_1}$  ;  
11   $k \leftarrow k + 1$  ;  
12  Update  $\sigma_{E_j}$  ;  
13 until  $\|\kappa_{E_j}(k) - \kappa_{E_j}(k-1)\|_1 < \mu$  and  $\|\tau_{E_j}(k) - \tau_{E_j}(k-1)\|_1 < \mu$ ;  
14 Reverse sort  $\kappa_{E_j}(k), \tau_{E_j}(k)$  ;  
15 return  $\kappa_{E_j}(k), \tau_{E_j}(k)$  ;
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