

| SYMBOL | EXPLANATION |
|-----------------|---|
| N_b | NUMBER OF BACKGROUND DOCUMENTS |
| N_f | NUMBER OF FOREGROUND DOCUMENTS |
| $N = N_b + N_f$ | TOTAL NUMBER OF DOCUMENTS |
| D_b | CORPUS CONSISTING OF BACKGROUND DOCUMENTS |
| D_f | CORPUS CONSISTING OF FOREGROUND DOCUMENTS |
| D | COMPOSITE CORPUS CONSISTING OF DOCUMENTS FROM D_b AND D_f |
| D_{bi} | i^{th} BACKGROUND DOCUMENT IN D_b |
| D_{fi} | i^{th} FOREGROUND DOCUMENT IN D_f |
| D_i | i^{th} DOCUMENT IN D |
| w_{bi} | WORDS IN i^{th} BACKGROUND DOCUMENT IN D_b |
| w_{fi} | WORDS IN i^{th} FOREGROUND DOCUMENT IN D_f |
| w_i | WORDS IN i^{th} DOCUMENT IN D |
| T_b | NUMBER OF BACKGROUND TOPICS |
| T_f | NUMBER OF FOREGROUND TOPICS |
| $T = T_b + T_f$ | TOTAL NUMBER OF TOPICS |
| N_d | NUMBER OF WORDS IN A SINGLE DOCUMENT |
| N_u | NUMBER OF UNIQUE WORDS IN THE DICTIONARY |
| η | HYPERPARAMETER FOR DISTRIBUTION OF γ |
| γ | SEVERITY HYPERPARAMETER FOR δ |
| s_c | CENTER OF SPATIAL REGION |
| n | SIZE OF SPATIAL REGION |
| S_{cn} | SET OF NODES IN SPATIAL REGION |
| p | SPARSITY PARAMETER |
| S | A SUBSET OF S_{cn} |
| δ | VARIABLE CAPTURING IF DOC HAS NEW TOPIC |
| α_b | DIRICHLET HYPERPARAMETER FOR MIXTURE OF OLD TOPICS |
| α | DIRICHLET HYPERPARAMETER FOR MIXTURE OF ALL TOPICS |
| ϕ_b | BACKGROUND TOPICS FROM 1.. T_b |
| ϕ_f | FOREGROUND TOPICS FROM 1.. T_f |
| ϕ | ALL TOPICS FROM 1.. $(T_b + T_f)$ |
| β_b | DIRICHLET HYPERPARAMETER FOR GENERATING BACKGROUND TOPICS |
| β_f | DIRICHLET HYPERPARAMETER FOR GENERATING FOREGROUND TOPICS |
| θ | MULTINOMIAL PARAMETER FOR DOCUMENT-SPECIFIC TOPIC MIXTURE |
| z | SAMPLED TOPIC PER WORD POSITION |
| w | SAMPLED WORD AT EACH POSITION |