Term Weight Calculation Report

Term Weight Calculator

April 25, 2025

1 Formula Used

$$w(t_i, d_j) = \frac{freq_{ij}}{\max\{\forall t_l \in d_j\} freq_{lj}} \times \log_2\left(\frac{N}{n_i} + 1\right) \tag{1}$$

2 Input Term Frequencies

Term	D1	D2	D3	Total
algorithme	0	0	1	1
base	0	1	0	1
c++	0	1	0	1
java	0	1	0	1
langage	1	2	2	5
programmation	1	0	1	2
python	1	0	0	1
programme	0	0	1	1
traitement	1	0	0	1
texte	1	0	0	1
traduire	0	0	1	1
utilisé	1	0	1	2

Table 1: Term frequencies in each document

3 Query Information

Query: {langage, python, java}

4 Term Weight Calculations

4.1 Term: algorithme

For document D1

$$w(algorithme, D1) = \frac{0}{1} \times \log_2\left(\frac{3}{1} + 1\right) \tag{2}$$

$$= 0.000 \times 2.000 \tag{3}$$

$$= 0.000 \tag{4}$$

Term	Frequency in Query
algorithme	0
base	0
c++	0
java	1
langage	1
programmation	0
python	1
programme	0
traitement	0
texte	0
traduire	0
utilisé	0

Table 2: Term frequencies in query

For document D2

$$w(algorithme, D2) = \frac{0}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{5}$$
$$= 0.000 \times 2.000 \tag{6}$$
$$= 0.000 \tag{7}$$

For document D3

$$w(algorithme, D3) = \frac{1}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{8}$$
$$= 0.500 \times 2.000 \tag{9}$$
$$= 1.000 \tag{10}$$

For query Q

$$w(algorithme, Q) = \frac{0}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{11}$$
$$= 0.000 \times 2.000 \tag{12}$$
$$= 0.000 \tag{13}$$

4.2 Term: base

For document D1

$$w(base, D1) = \frac{0}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{14}$$
$$= 0.000 \times 2.000 \tag{15}$$
$$= 0.000 \tag{16}$$

For document D2

$$w(base, D2) = \frac{1}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{17}$$
$$= 0.500 \times 2.000 \tag{18}$$
$$= 1.000 \tag{19}$$

For document D3

$$w(base, D3) = \frac{0}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{20}$$
$$= 0.000 \times 2.000 \tag{21}$$
$$= 0.000 \tag{22}$$

For query Q

$$w(base, Q) = \frac{0}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{23}$$
$$= 0.000 \times 2.000 \tag{24}$$
$$= 0.000 \tag{25}$$

4.3 Term: c++

For document D1

$$w(c++, D1) = \frac{0}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{26}$$
$$= 0.000 \times 2.000 \tag{27}$$
$$= 0.000 \tag{28}$$

For document D2

$$w(c++, D2) = \frac{1}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{29}$$
$$= 0.500 \times 2.000 \tag{30}$$
$$= 1.000 \tag{31}$$

For document D3

$$w(c++, D3) = \frac{0}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{32}$$
$$= 0.000 \times 2.000 \tag{33}$$
$$= 0.000 \tag{34}$$

For query Q

$$w(c++, Q) = \frac{0}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{35}$$
$$= 0.000 \times 2.000 \tag{36}$$
$$= 0.000 \tag{37}$$

4.4 Term: java

For document D1

$$w(java, D1) = \frac{0}{1} \times \log_2\left(\frac{3}{1} + 1\right) \tag{38}$$
$$= 0.000 \times 2.000 \tag{39}$$
$$= 0.000 \tag{40}$$

For document D2

$$w(java, D2) = \frac{1}{2} \times \log_2\left(\frac{3}{1} + 1\right) \tag{41}$$
$$= 0.500 \times 2.000 \tag{42}$$
$$= 1.000 \tag{43}$$

For document D3

$$w(java, D3) = \frac{0}{2} \times \log_2\left(\frac{3}{1} + 1\right) \tag{44}$$
$$= 0.000 \times 2.000 \tag{45}$$
$$= 0.000 \tag{46}$$

For query Q

$$w(java, Q) = \frac{1}{1} \times \log_2\left(\frac{3}{1} + 1\right) \tag{47}$$
$$= 1.000 \times 2.000 \tag{48}$$
$$= 2.000 \tag{49}$$

4.5 Term: langage

For document D1

$$w(langage, D1) = \frac{1}{1} \times \log_2\left(\frac{3}{3} + 1\right) \tag{50}$$
$$= 1.000 \times 1.000 \tag{51}$$
$$= 1.000 \tag{52}$$

For document D2

$$w(langage, D2) = \frac{2}{2} \times \log_2\left(\frac{3}{3} + 1\right) \tag{53}$$
$$= 1.000 \times 1.000 \tag{54}$$
$$= 1.000 \tag{55}$$

For document D3

$$w(langage, D3) = \frac{2}{2} \times \log_2 \left(\frac{3}{3} + 1 \right) \tag{56}$$
$$= 1.000 \times 1.000 \tag{57}$$
$$= 1.000 \tag{58}$$

For query Q

$$w(langage, Q) = \frac{1}{1} \times \log_2 \left(\frac{3}{3} + 1 \right) \tag{59}$$
$$= 1.000 \times 1.000 \tag{60}$$
$$= 1.000 \tag{61}$$

4.6 Term: programmation

For document D1

$$w(programmation, D1) = \frac{1}{1} \times \log_2 \left(\frac{3}{2} + 1 \right) \tag{62}$$
$$= 1.000 \times 1.322 \tag{63}$$
$$= 1.322 \tag{64}$$

For document D2

$$w(programmation, D2) = \frac{0}{2} \times \log_2 \left(\frac{3}{2} + 1 \right) \tag{65}$$
$$= 0.000 \times 1.322 \tag{66}$$
$$= 0.000 \tag{67}$$

For document D3

$$w(programmation, D3) = \frac{1}{2} \times \log_2 \left(\frac{3}{2} + 1 \right) \tag{68}$$
$$= 0.500 \times 1.322 \tag{69}$$
$$= 0.661 \tag{70}$$

For query Q

$$w(programmation, Q) = \frac{0}{1} \times \log_2 \left(\frac{3}{2} + 1 \right) \tag{71}$$
$$= 0.000 \times 1.322 \tag{72}$$
$$= 0.000 \tag{73}$$

4.7 Term: python

For document D1

$$w(python, D1) = \frac{1}{1} \times \log_2\left(\frac{3}{1} + 1\right) \tag{74}$$
$$= 1.000 \times 2.000 \tag{75}$$
$$= 2.000 \tag{76}$$

For document D2

$$w(python, D2) = \frac{0}{2} \times \log_2\left(\frac{3}{1} + 1\right) \tag{77}$$
$$= 0.000 \times 2.000 \tag{78}$$
$$= 0.000 \tag{79}$$

For document D3

$$w(python, D3) = \frac{0}{2} \times \log_2\left(\frac{3}{1} + 1\right) \tag{80}$$
$$= 0.000 \times 2.000 \tag{81}$$
$$= 0.000 \tag{82}$$

For query Q

$$w(python, Q) = \frac{1}{1} \times \log_2\left(\frac{3}{1} + 1\right) \tag{83}$$
$$= 1.000 \times 2.000 \tag{84}$$
$$= 2.000 \tag{85}$$

4.8 Term: programme

For document D1

$$w(programme, D1) = \frac{0}{1} \times \log_2\left(\frac{3}{1} + 1\right) \tag{86}$$
$$= 0.000 \times 2.000 \tag{87}$$
$$= 0.000 \tag{88}$$

For document D2

$$w(programme, D2) = \frac{0}{2} \times \log_2\left(\frac{3}{1} + 1\right) \tag{89}$$
$$= 0.000 \times 2.000 \tag{90}$$
$$= 0.000 \tag{91}$$

For document D3

$$w(programme, D3) = \frac{1}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{92}$$
$$= 0.500 \times 2.000 \tag{93}$$
$$= 1.000 \tag{94}$$

For query Q

$$w(programme, Q) = \frac{0}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{95}$$
$$= 0.000 \times 2.000 \tag{96}$$
$$= 0.000 \tag{97}$$

4.9 Term: traitement

For document D1

$$w(traitement, D1) = \frac{1}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{98}$$
$$= 1.000 \times 2.000 \tag{99}$$
$$= 2.000 \tag{100}$$

For document D2

$$w(traitement, D2) = \frac{0}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{101}$$
$$= 0.000 \times 2.000 \tag{102}$$
$$= 0.000 \tag{103}$$

For document D3

$$w(traitement, D3) = \frac{0}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{104}$$
$$= 0.000 \times 2.000 \tag{105}$$
$$= 0.000 \tag{106}$$

For query Q

$$w(traitement, Q) = \frac{0}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{107}$$
$$= 0.000 \times 2.000 \tag{108}$$
$$= 0.000 \tag{109}$$

4.10 Term: texte

For document D1

$$w(texte, D1) = \frac{1}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{110}$$
$$= 1.000 \times 2.000 \tag{111}$$
$$= 2.000 \tag{112}$$

For document D2

$$w(texte, D2) = \frac{0}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{113}$$
$$= 0.000 \times 2.000 \tag{114}$$
$$= 0.000 \tag{115}$$

For document D3

$$w(texte, D3) = \frac{0}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{116}$$
$$= 0.000 \times 2.000 \tag{117}$$
$$= 0.000 \tag{118}$$

For query Q

$$w(texte, Q) = \frac{0}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{119}$$
$$= 0.000 \times 2.000 \tag{120}$$
$$= 0.000 \tag{121}$$

4.11 Term: traduire

For document D1

$$w(traduire, D1) = \frac{0}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{122}$$
$$= 0.000 \times 2.000 \tag{123}$$
$$= 0.000 \tag{124}$$

For document D2

$$w(traduire, D2) = \frac{0}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{125}$$
$$= 0.000 \times 2.000 \tag{126}$$
$$= 0.000 \tag{127}$$

For document D3

$$w(traduire, D3) = \frac{1}{2} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{128}$$
$$= 0.500 \times 2.000 \tag{129}$$
$$= 1.000 \tag{130}$$

For query Q

$$w(traduire, Q) = \frac{0}{1} \times \log_2 \left(\frac{3}{1} + 1 \right) \tag{131}$$
$$= 0.000 \times 2.000 \tag{132}$$
$$= 0.000 \tag{133}$$

4.12 Term: utilisé

For document D1

$$w(utilis, D1) = \frac{1}{1} \times \log_2 \left(\frac{3}{2} + 1 \right) \tag{134}$$
$$= 1.000 \times 1.322 \tag{135}$$
$$= 1.322 \tag{136}$$

For document D2

$$w(utilis, D2) = \frac{0}{2} \times \log_2 \left(\frac{3}{2} + 1 \right) \tag{137}$$
$$= 0.000 \times 1.322 \tag{138}$$
$$= 0.000 \tag{139}$$

For document D3

$$w(utilis, D3) = \frac{1}{2} \times \log_2 \left(\frac{3}{2} + 1 \right) \tag{140}$$
$$= 0.500 \times 1.322 \tag{141}$$
$$= 0.661 \tag{142}$$

For query Q

$$w(utilis, Q) = \frac{0}{1} \times \log_2 \left(\frac{3}{2} + 1 \right) \tag{143}$$
$$= 0.000 \times 1.322 \tag{144}$$
$$= 0.000 \tag{145}$$

5 Final Term Weights

Term	D1	D2	D3	Q
algorithme	0.000	0.000	1.000	0.000
base	0.000	1.000	0.000	0.000
c++	0.000	1.000	0.000	0.000
java	0.000	1.000	0.000	2.000
langage	1.000	1.000	1.000	1.000
programmation	1.322	0.000	0.661	0.000
python	2.000	0.000	0.000	2.000
programme	0.000	0.000	1.000	0.000
traitement	2.000	0.000	0.000	0.000
texte	2.000	0.000	0.000	0.000
traduire	0.000	0.000	1.000	0.000
utilisé	1.322	0.000	0.661	0.000

Table 3: Final term weights