NDCG

A way to measure effectiveness of web search engine algorithms

Source from Wikipedia

$$\mathrm{CG_p} = \sum_{i=1}^{p} rel_i$$

$$\mathrm{DCG_p} = \sum_{i=1}^{p} \frac{rel_i}{\log_2(i+1)} = rel_1 + \sum_{i=2}^{p} \frac{rel_i}{\log_2(i+1)}$$

$$\mathrm{DCG_p} = \sum_{i=1}^{p} \frac{2^{rel_i} - 1}{\log_2(i+1)}$$

NDCG： Normalized DCG
DCG ： Discounted Cumulative Gain
CG ： Cumulative Gain

A1, A2, A3, A4, A5, A6

3 2 3 0 1 2

CG: 3 + 2+ 3+ 0+ 1+ 2 = 11

DCG:

i	rel_i	$\log_2(i+1)$	$\frac{rel_i}{\log_2(i+1)}$
1	3	1	3
2	2	1.585	1.262
3	3	2	1.5
4	0	2.322	0
5	1	2.585	0.387
6	2	2.807	0.712

= 6.861

NDCG：Normalized DCG

$$\mathrm{nDCG_p} = \frac{DCG_p}{IDCG_p},$$

Ideal ordering ?

3, 3, 2, 2, 1, 0

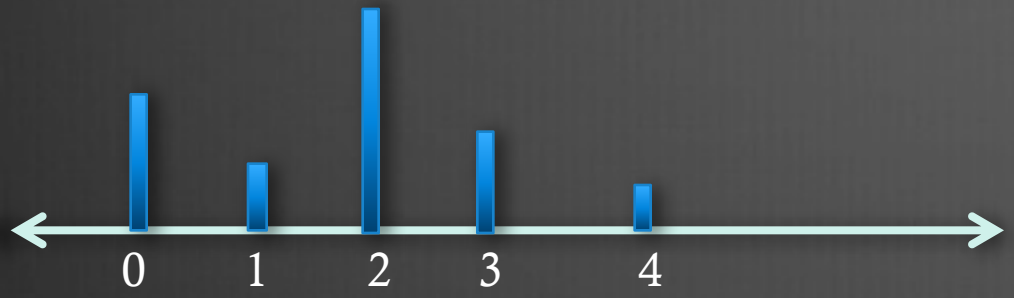
$$\mathrm{nDCG_6} = \frac{DCG_6}{IDCG_6} = \frac{6.861}{7.141} = 0.961$$

How is related with Airbnb evaluation ?

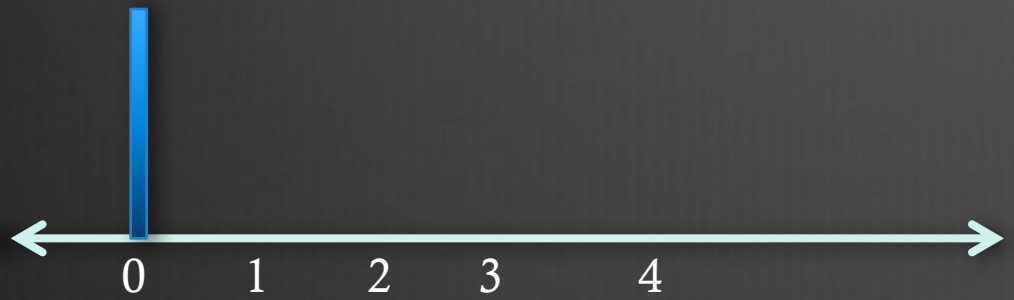
For each new user, you are to make a maximum of 5 predictions on the country of the first booking. The ground truth country is marked with relevance = 1, while the rest have relevance = 0.

[FR] gives a $NDCG = \frac{2^1-1}{log_2(1+1)} = 1.0$

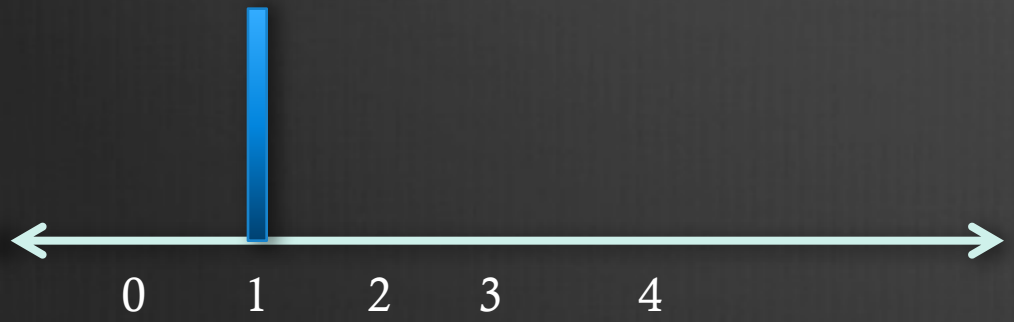
[US, FR] gives a $DCG = \frac{2^0-1}{log_2(1+1)} + \frac{2^1-1}{log_2(2+1)} = \frac{1}{1.58496} = 0.6309$



Predict



True



Reduced
Answer