

NDCG

A way to measure effectiveness of web search engine algorithms

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

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

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

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

$$\text{nDCG}_p = \frac{DCG_p}{IDCG_p},$$

Ideal ordering ?

3, 3, 2, 2, 1, 0

$$\text{nDCG}_6 = \frac{DCG_6}{IDCG_6} = \frac{6.861}{7.141} = 0.961$$

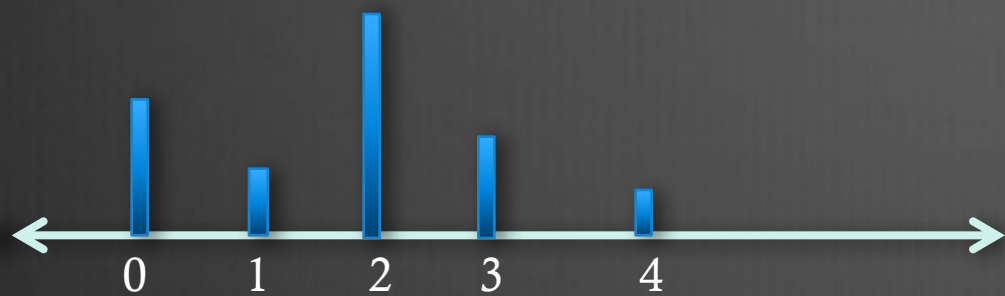


How is related with Airbnb evaluation ?

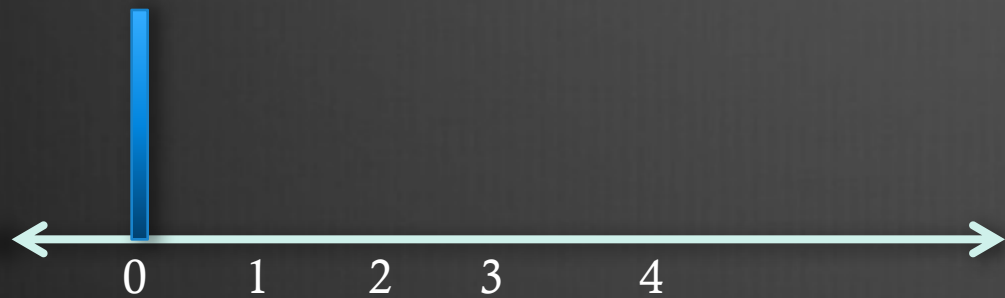
For each new user, you are to make a maximum of 5 predictions on the country of the first booking. The ground truth country is marked with relevance = 1, while the rest have relevance = 0.

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

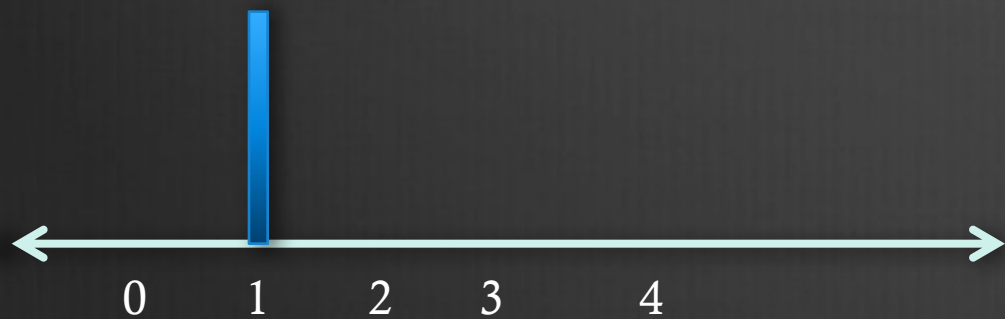
$$[\text{US}, \text{FR}] \text{ gives a } DCG = \frac{2^0 - 1}{\log_2(1+1)} + \frac{2^1 - 1}{\log_2(2+1)} = \frac{1}{1.58496} = 0.6309$$



Predict



True



Reduced
Answer