



deeplearning.ai

# Sequence to sequence models

---

## Refinements to beam search

# Length normalization

$$p(y^{(1)} \dots y^{(T_y)} | x) = \frac{p(y^{(1)} | x)}{p(y^{(T_y)} | x, y^{(1)}, \dots, y^{(T_y-1)})} \dots$$

$$\arg \max_y \prod_{t=1}^{T_y} P(y^{(t)} | x, y^{(1)}, \dots, y^{(t-1)})$$

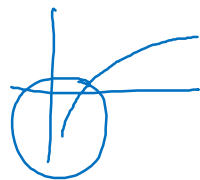
log

$$\arg \max_y \sum_{t=1}^{T_y} \log P(y^{(t)} | x, y^{(1)}, \dots, y^{(t-1)}) \leftarrow$$

$T_y = 1, 2, 3, \dots, 30.$

score  $\rightarrow$

$$\frac{1}{T_y^\alpha} \sum_{t=1}^{T_y} \log P(y^{(t)} | x, y^{(1)}, \dots, y^{(t-1)})$$



$$\log P(y|x) \leftarrow$$

$$P(y|x) \leftarrow$$

$$\underline{\alpha = 0.7}$$

$$\underline{\alpha = 1}$$

$$\underline{\alpha = 0}$$

长句子

# Beam search discussion

Beam width  $B$ ?

$1 \rightarrow 3 \rightarrow 10, \quad 100, \quad 1000 \rightarrow 3000$

large  $B$ : better result, slower  
small  $B$ : worse result, faster

Unlike exact search algorithms like BFS (Breadth First Search) or DFS (Depth First Search), Beam Search runs faster but is not guaranteed to find exact maximum for  $\arg \max_y P(y|x)$ .