deeplearning.ai

Sequence to sequence models

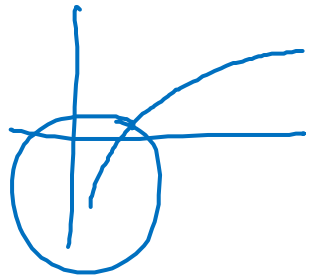
Refinements to beam search

Length normalization

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

$$P(y^{<1>} \ldots y^{<T_y>} | x) = P(y^{<1>} | x)\, P(y^{<2>} | x, y^{<1>}) \cdots P(y^{<T_y>} | x, y^{<1>}, \ldots, y^{<T_y-1>})$$

log



$\log P(y|x)$ ←

$P(y|x)$ ←

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

Use log to prevent underflow

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

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

Length normalization to prevent algorithms always prefer shorter translations.

$\alpha = 0.7$ $\alpha = 1$ $\alpha = 0$

Andrew Ng

Beam search discussion

Beam width B?

1 -> 3 -> 10, 100, 1000, -> 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 $\arg\max_y P(y|x)$.