$$P(B|A) = \frac{P(A,B)}{P(A)}$$

$$= P(its)$$

$$P(W_1, W_2, ..., W_k) \approx \prod_{i} P(W_i) |W_{i-k}...W_{i-j})$$
 $P(\text{the } | \text{its water is so transparent})$
 $\approx P(\text{the } | \text{that}) U \text{nigram}$

St P (the transparent that) Bigram.

$$P(W_1, W_2, \dots, W_k)$$

$$= P(W_1) \times P(W_2 | W_1)$$

$$\times P(W_3 | W_1, W_2) \dots$$

$$\times P(W_{k} | W_{k-2}, W_{k-1})$$

Trigram:

$$P(W_1, W_2, \cdots W_k)$$

=
$$P(W_1) \times P(W_2|W_1)$$

$$\times \frac{k}{\prod_{i=3}^{k} P(W_k | W_{k-2}, W_{k-1})}$$

You can continue to longer N-grams but the combinations of words become more specific, so might be possible that N-grams not being present in the training data.

$$P(I | \langle s \rangle) = \frac{2}{3}$$

$$P(am | I) = \frac{C(Iam)}{C(I)} - \frac{2}{3}$$

$$P(W_{i}|W_{i-1}) = \frac{C(W_{i-1},W_{i})}{C(W_{i-1})}$$

In practice,
these probabilities should be calculated under log
to avoid. underflow

Applying Trigran
$$P = P(W_1) \times P(W_2|W_1)$$

$$\times \frac{k}{11} P(W_k|W_{k-2}, k-1)$$

$$\lambda = 2$$

$$P(ss) = \frac{3}{3} = 1$$

$$P(T(ss)) = \frac{2}{3} = 0.67$$

$$P(am | ss) = \frac{1}{2} = 0.5$$

(s) I am Sam (/s)
(s) Sam I am (/s)
(s) I do not like green eggs
and ham
$$P(Sam \mid T \mid am) = \frac{1}{2} = 0.5$$

$$P(\langle /s \rangle \mid \text{am } Sam) = \frac{1}{1} = 1$$

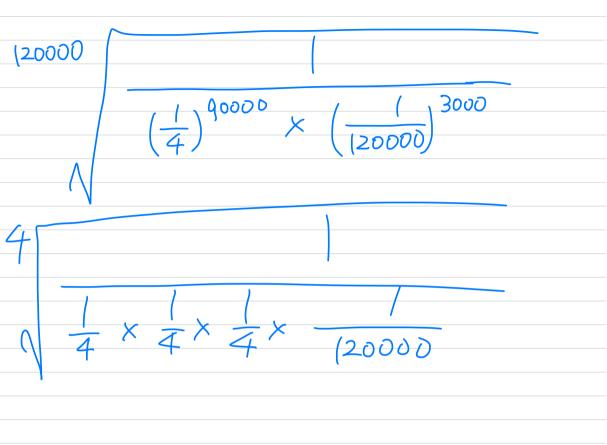
 $P(\langle s \rangle \mid Sam \langle /s \rangle) = \frac{1}{1} = 1$

$$P(W_3|W_1,W_2)$$

$$= C(W_1,W_2,W_3)$$

$$= C(W_1,W_2)$$

P



$$\sqrt{(60)} \times (\frac{1}{100})^{9}$$

1.725

$$\times P(food)$$

$$=0.19 \times 0.21 \times 0.0029 \times 0.052 \times 0.40$$

(2) The un-smoothed one is higher because the smoothed probability will provide some prob to the Situation that will never happen, (probability = 0), so the probability Will be moveden in the smoothed probability,

P (Sam am) C(am Sam) + the number of Gocab

$$P(W_3 \mid W_1, W_2)$$

$$= \frac{C(W_1, W_2, W_3) + I}{C(W_1, W_2) + V}$$

$$P(w_i \mid w_{i-1}) = \frac{c(w_{i-1}, w_i)}{c(w_{i-1})}$$
 ~~\$\frac{1}{3} \text{ am Sam~~ }\$
~~\$\frac{1}{3} \text{ am Sam~~ }\$

$$\langle s \rangle \text{ Sam I am } \langle s \rangle$$

$$\langle s \rangle \text{ Ido not like green eggs and ham } \langle s \rangle$$

$$P(I|\langle s \rangle) = \frac{c(I,\langle s \rangle)}{c(\langle s \rangle)} = \frac{2}{3}$$

$$C(S_3) = \frac{3}{3}$$

$$P(am|T) = \frac{C(am,T)}{C(T)} = \frac{2}{3} = 0.67$$

$$P(a|b) = P(b) \cdot P(a,b)$$

P(A) = 0.4

P(B)= 0.3

P(c) = 0.2

$$= \frac{6}{10} \times \frac{7}{10}$$