Exercise 3.2 – Probability of Sentence: "i want chinese food"

Unsmoothed Trigram Model (using counts from Figure 3.2 and useful probabilities):

* Assume we use trigram estimates:
* P(want | , i)
* P(chinese | i, want)
* P(food | want, chinese)
* P( | chinese, food)

Final probability is:

* [P(i | ) P(want | , i) × P(chinese | i, want) × P(food | want, chinese) × P( | chinese, food)]

Values (from the figure):

* P(i | ) = 1.0
* P(want | , i) = 0.33
* P(chinese | i, want) = 1.0
* P(food | want, chinese) = 1.0
* P( | chinese, food) = 1.0

Total:

1.0 × 0.33 × 1.0 × 1.0 × 1.0 = 0.33

Add-One Smoothed Trigram Model (with given values):

* P(i | ) = 0.19
* P(want | , i) = 0.14
* P(chinese | i, want) = 0.25
* P(food | want, chinese) = 0.33
* P( | chinese, food) = 0.40

Total:

0.19 × 0.14 × 0.25 × 0.33 × 0.40 ≈ 0.00088