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18/ BE (MPNA)

182027

IAT-1 NLP

Q2] B) $P(\text{tell} | \text{I}) = \frac{c(\text{tell}, \text{I})}{c(\text{I})}$

<S> I tell you to sleep and to rest </s>

<S> I would like to sleep for an hour </s>

<S> sleep helps one to relax </s>

Bigram Probabilities

$$P(\text{I} | \text{<S>}) = \frac{c(\text{<S>, I})}{c(\text{<S>})} = \frac{2}{3} = 0.67$$

$$P(\text{I} | \text{tell}) = \frac{1}{2} = 0.5$$

$$P(\text{you} | \text{tell}) = \frac{c(\text{tell, you})}{c(\text{tell})} = \frac{1}{1} = 1$$

$$P(\text{to} | \text{you}) = \frac{c(\text{you, to})}{c(\text{you})} = \frac{1}{1} = 1$$

$$P(\text{sleep} | \text{to}) = \frac{c(\text{to, sleep})}{c(\text{to})} = \frac{2}{4} = 0.5$$

$$P(\text{and} | \text{sleep}) = \frac{c(\text{sleep, and})}{c(\text{sleep})} = \frac{1}{3} = 0.33$$

$$P(\text{to} | \text{and}) = \frac{c(\text{and, to})}{c(\text{and})} = \frac{1}{1} = 1$$

$$P(\text{rest} | \text{to}) = \frac{c(\text{to, rest})}{c(\text{to})} = \frac{1}{4} = 0.25$$

$$P(\text{</s>} | \text{rest}) = \frac{c(\text{rest, </s>})}{c(\text{rest})} = \frac{1}{1} = 1$$

$$P(\text{would} | \text{I}) = \frac{c(\text{I, would})}{c(\text{I})} = \frac{1}{2} = 0.5$$

$$P(\text{for} | \text{sleep}) = \frac{c(\text{sleep, for})}{c(\text{sleep})} = \frac{1}{3} = 0.33$$

2/2

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5 would like $P(\text{like} | \text{would}) = \frac{c(\text{would, like})}{c(\text{would})} = 1$

sleep for $P(\text{for} | \text{sleep}) = \frac{c(\text{sleep, for})}{c(\text{sleep})} = \frac{1}{3} = 0.33$

10 for an $P(\text{an} | \text{for}) = \frac{c(\text{for, an})}{c(\text{for})} = 1$

an hour $P(\text{hour} | \text{an}) = \frac{c(\text{an, hour})}{c(\text{an})} = 1$

hour $P(</s> | \text{hour}) = \frac{c(\text{hour, } </s>)}{c(\text{hour})} = 1$

15 $</s>$ sleep $P(\text{sleep} | </s>) = \frac{1}{3} = 0.33$

sleep help $P(\text{helps} | \text{sleep}) = \frac{1}{3} = 0.33$

20 helps one $P(\text{one} | \text{helps}) = \frac{c(\text{helps, one})}{c(\text{helps})} = 1$

one to $P(\text{to} | \text{one}) = \frac{c(\text{one, to})}{c(\text{one})} = 1$

to relax $P(\text{relax} | \text{to}) = \frac{c(\text{to, relax})}{c(\text{to})} = \frac{1}{4} = 0.25$

25 relax $P(</s> | \text{relax}) = \frac{c(\text{relax, } </s>)}{c(\text{relax})} = 1$

like $P(\text{to} | \text{like}) = \frac{c(\text{like, to})}{c(\text{like})} = 1$

30 The next words for I to are

sleep (0.5), rest (0.25), relax (0.25)