Shubham Soni Nath 9143 NLP Assignment 1

Q1] Given: "[BOS] my friend is good [EOS]"

A) ① Bigram

$P(\text{my friend is good})$

$= P(\text{my}/[\text{BOS}]) \cdot P(\text{friend}/\text{my}) \cdot P(\text{is}/\text{friend}) \cdot P(\text{good}/\text{is}) \cdot P([\text{EOS}]/\text{good})$

$= \frac{C([\text{BOS}]/\text{my})}{C([\text{BOS}])} \cdot \frac{C(\text{my}/\text{friend})}{C(\text{my})} \cdot \frac{C(\text{friend}/\text{is})}{C(\text{friend})} \cdot \frac{C(\text{is}/\text{good})}{C(\text{is})} \cdot \frac{C(\text{good}/[\text{EOS}])}{C(\text{good})}$

$= \frac{0}{4} \times \frac{2}{2} \times \frac{0}{3} \times \frac{1}{2} \times \frac{1}{2}$

$= 0$

② Trigram

$P(\text{my friend is good})$

$= P(\text{friend}/\text{my}, [\text{BOS}]) \cdot P(\text{is}, \text{friend}, \text{my}) \cdot P(\text{good}/\text{is}, \text{friend}) \cdot P([\text{EOS}]/\text{good}, \text{is})$

$= \frac{C([\text{BOS}]/\text{my}, \text{friend})}{C([\text{BOS}], \text{my})} \cdot \frac{C(\text{my}/\text{friend}, \text{is})}{C(\text{my}, \text{friend})} \cdot \frac{C(\text{friend}/\text{is}, \text{good})}{C(\text{friend}, \text{is})} \cdot \frac{C(\text{is}/\text{good}, [\text{EOS}])}{C(\text{is}, \text{good})}$

$= \frac{0}{0} \times \frac{0}{2} \times \frac{0}{0} \times \frac{0}{1}$

$= 0$