<Chapter 4>

4.1 $\hat{C} = \underset{c \in C}{\operatorname{argmax}}\ P(c)\,P(\text{I always like foreign films})$

$= \underset{c \in C}{\operatorname{argmax}}\ P(c) \prod_{i \in pos} P(w_i)$

$P(c)$ is equal → Pos : $0.09 \times 0.07 \times 0.29 \times 0.04 \times 0.08$

Neg : $0.16 \times 0.06 \times 0.06 \times 0.15 \times 0.11$

Negative

4.2 fun, couple, love, fast, furious, shoot, fly, ⇒ 7 tokens.

	(3) action	(2) comedy
fun	1	3
couple	0	2
love	1	2
fast	2	1
furious	0	2
shoot	4	0
fly	1	1
	= 9	= 11

1) Action.

$$\frac{3}{5} \times \frac{3}{16} \times \frac{1}{16} \times \frac{5}{16} \times \frac{2}{16}$$

2) Couple

$$\frac{2}{5} \times \frac{2}{18} \times \frac{3}{18} \times \frac{1}{18} \times \frac{2}{18}$$

Action

4.3

1) Multinomial

$$\text{Pos}: \frac{2}{5} \times \frac{4}{12} \times \frac{4}{12} \times \frac{6}{12} \times \frac{2}{12} = \frac{1}{5 \times 2 \times 3^2} \sim -1.95$$

$$\text{Neg}: \frac{3}{5} \times \frac{3}{11} \times \frac{3}{11} \times \frac{3}{11} \times \frac{11}{11} = \frac{3^4 \times 11}{5 \times 11^4} \sim -2.61$$

⇒ Positive

2) Binary

1 1 2 Pos ?

2 3 1 Neg

$$\text{Pos}: \frac{2}{5} \times \frac{2}{11} \times \frac{2}{11} \times \frac{3}{11} \times \frac{2}{11} = \frac{48}{5 \times 11^4} \sim -2.40$$

$$\text{Neg}: \frac{3}{5} \times \frac{3}{9} \times \frac{3}{9} \times \frac{2}{9} \times \frac{4}{9} = \frac{8}{5 \times 243} \sim -2.18$$

⇒ Negative