Exercise

Cat	Documents
Training —	just plain boring
—	entirely predictable and lacks energy
—	no surprises and very few laughs
+	very powerful
+	the most fun film of the summer
Test ?	predictable with no fun

Solution!

Collection of Vocabulary! just, plain, boring, entirely, predictable, and, lacks, energy, no, surprises, very, few, laughs, powerful, the, most, fun, film, of, summer.

- Prior from training

$$P(C_i) = \frac{N_c}{M_{total}}$$

$$\Rightarrow P(-) = 3/5 \quad \& \quad P(+) = 2/5$$

- Likelihood from training

$$P(w_i | c) = \frac{Count(w_i, c) + 1}{(\sum_{w \in V} Count(w, c)) + |V|}$$

Given: $|V| = $ no. of unique words $= 20$

$$\therefore P(\text{Predictable} \mid +) = \frac{1}{29}$$

$$P(\text{Predictable} \mid -) = \frac{1+1}{14+20}, \quad \frac{2}{37} \neq \frac{1}{17}$$

$$P(\text{no} \mid +) = \frac{0+1}{9+20}, \quad \frac{1}{29}$$

$$P(\text{no} \mid -) = \frac{1+1}{14+20} = \frac{1}{17}$$

$$P(\text{fun} \mid -) = \frac{0+1}{14+20}, \quad \frac{1}{34} \qquad\qquad P(\text{fun} \mid +) = \frac{1+1}{9+20} = \frac{2}{29}$$

$$P(-\mid \text{test}) = \frac{3}{5} \times \frac{2}{34} \times \frac{2}{34} \times \frac{1}{34} = 6.106 \times 10^{-5} \qquad\text{——①}$$

$$P(+\mid \text{test}) = \frac{2}{5} \times \frac{1}{29} \times \frac{1}{29} \times \frac{2}{29} = 3.2 \times 10^{-5} \qquad\text{——②}$$

Here, $P(-\mid \text{test}) > P(+\mid \text{test})$

So, we can conclude that the test document is of negative category.