Bayesian Inference

prior : Beta distribution

$$\hat{\theta} = \hat{p} = \frac{(a_1+b_1)}{(a_1+b_1)+(a_2+b_2)}$$

Ex) n=10인 동전던지기에서 앞면이 2번, 뒷면이 8번 나왔다고 하자.

a_1 a_2

$a_1 = 2, \quad a_2 = 8$

<Maximum Likelihood Estimation>

$n = a_1 + a_2$ $\quad \hat{p} = \frac{2}{2+8} = \frac{2}{10} = 0.2$

<Bayesian Estimation>

$$\hat{p} = \frac{(a_1+b_1)}{(a_1+b_1)+(a_2+b_2)} = \frac{2+b_1}{(2+b_1)+(8+b_2)} = \frac{2+b_1}{10+b_1+b_2}$$

b_1	b_2	$\hat{p}$
1	1	$\frac{3}{12}$
10	10	$\frac{12}{30}$
100	100	$\frac{102}{210}$
1000	1000	$\frac{1002}{2010}$

b_1, b_2 값이 커짐

$\hat{p}$ 값이 0.2에 가까워짐