$CI_{b_1} = 0.0006$

MUTUAL INFORMATION (Feature selection)

$$MI = \sum_{x \in X} \sum_{y \in Y} p(x,y) \log \left[\frac{p(x,y)}{p(x)\, p(y)} \right]$$

Where

$p(x,y) \rightarrow$ Joint prob of x & y

$p(x) \rightarrow$ marginal prob of x

$p(y) \rightarrow$ " " " y

Ex → Sex & Survived col

→ 5-passengers

→ Input → Output.

Sex (x)	Survived (y)
M	0
F	1
M	0
F	0
M	1

→ We make contegncy table.

Sex	Survived 0	Survived 1
M	2	1
F	1	1

→

	0	1
M	2/5	1/5
F	1/5	1/5

Joint Prob ⇒ $P(x=m, y=0) = \frac{2}{5}$

$P(x=F, y=0) = \frac{1}{5}$

$P(x=m, y=1) = \frac{1}{5}$

$P(x=F, y=1) = \frac{1}{5}$

P(x) & P(y)

P(m) + P(F) P(0) + P(1)

	0	1	P(x)
M	$\frac{2}{5}$	$\frac{1}{5}$	$\frac{3}{5}$
F	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{2}{5}$
P(y)	$\frac{3}{5}$	$\frac{2}{5}$	

put in formula

Mutual info =

$$\frac{2}{5}\log\left(\frac{\frac{2}{5}}{\frac{3}{5}\times\frac{3}{5}}\right) + \frac{1}{5}\log\left(\frac{\frac{1}{5}}{\frac{3}{5}\times\frac{2}{5}}\right)$$

$$+ \frac{1}{5}\log\left(\frac{\frac{1}{5}}{\frac{3}{5}\times\frac{2}{5}}\right) + \frac{1}{5}\log\left(\frac{\frac{1}{5}}{\frac{2}{5}\times\frac{2}{5}}\right)$$