Basic Data Analysis

Stephen Turnbull

Business Administration and Public Policy

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Abstract

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- “ ‘ ’ ” “2 7 ”
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- 1
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  - “ or ” “ ”

- 1 2 3 4 5 6
- “ ”
- or “1 6 ”
- “ ”
- “, ” “ ” 1 6

- 1,1 1,2 2,1 1,3 2,2
- “ ”
- or “1 6 ”
- “ 1,6 ”
- “ 1,6 2,5 3,4 4,3 5,2 6,1 ” “ 7”
  1,6 6,1

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- “-1,452 ” “0”
- “-100,000,000,000 +100,000,000,000 ”
- “ ” “ ”
- “ ” or
  -

- “ or ” p, P, “ ” Prob
- E $P(E) \geq 0$
- $P(\{\}) = 0$
- $P(\Omega) = 1$ “ ”
- $a \in \Omega$ and $b \in \Omega$ $P(\{a, b\}) = P(\{a\}) + P(\{b\})$
- “ ” “ ”

or

- A, B “A B ”
  - $P(A \cup B) \leq P(A) + P(B)$
  - “ ” A B
- A, B “A B ”
  - $P(A \cap B) \geq P(A)P(B)$
  - “ ” A B
  - A “A ” $P(\bar{A}) = 1 - P(A)$

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– “ ” “ ” “ ”

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• A B $P(A \cup B) = P(A) + P(B)$

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-
- A B $P(A \cap B) = P(A)P(B)$

- A A B A $P(B|A)$

- $P(B|A) = P(B \cap A)/P(A)$
- A“ ” B“ ” “ ”
  - $P(A|B) = 2/3$ $P(A|\bar{B}) = 1/3$
- A B
- A B

-
- $\mathcal{E}[X]$ $\mathcal{E}[g(X)]$ $g(X)$
-

$$\mathcal{E}[X] = \sum_{i=1}^{n} x_i p(x_i) = x_1 p(x_1) + \cdots + x_n p(x_n).$$

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$$\mathcal{E}[X] = \int_{-\infty}^{\infty} x f(x)\, dx.$$

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$$\mathcal{E}[a + bX + cY] = a + b\mathcal{E}[X] + c\mathcal{E}[Y]$$

r.v.s X,Y a,b,c

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$$\mathcal{E}[X^2] \neq (\mathcal{E}[X])^2$$

$$\mathcal{E}[XY] \neq \mathcal{E}[X]\mathcal{E}[Y]$$

- X Y r.v.s

$$\mathcal{E}[XY] = \mathcal{E}[X]\mathcal{E}[Y]$$

-
-

“ ” or f

“argmax” $F(x) = \frac{1}{2}$ “argmax” of f and $F(x) = \frac{1}{2}$ can be defined).

- $\mathcal{V}[X] = \mathcal{E}[(X - \mathcal{E}[X])^2]$ X

- $\mathcal{V}[X] = \mathcal{E}[X^2] - (\mathcal{E}[X])^2$

- X X

- $\mathcal{E}[|X|]$ “ ” “ ”

- ( ) $\mathcal{E}[(X-\mathcal{E}[X])^3]/(\mathcal{V}[x])^{\frac{3}{2}}$
- $\mathcal{E}[(X-\mathcal{E}[X])^4]/(\mathcal{V}[x])^2$ ( )
- $R(Q)$ $C(Q)$ Q $\mathcal{E}[R(Q)-C(Q)]$

vs.

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- $\Omega = \{\texttt{boy}, \texttt{girl}\}$ $P(\texttt{boy}) = P(\texttt{girl}) = 1/2$ X

$$X(\texttt{boy}) = 0, \quad X(\texttt{girl}) = 1$$

Y

$$Y(\texttt{boy}) = 1, \quad Y(\texttt{girl}) = 0$$

$p_X(0) = p_Y(0) = 1/2$, and $p_X(1) = p_Y(1) = 1/2$ p_X p_Y X Y !