

1. 前三章知识与 Probability 的相似之处.

1.1 章节与知识结构.

2. 典型题型与考点.

3. Probability 在后续章节的作用.

Probability \Rightarrow Cumulative Relative Frequency.

事件发生可能性的度量

Event

Random Variable

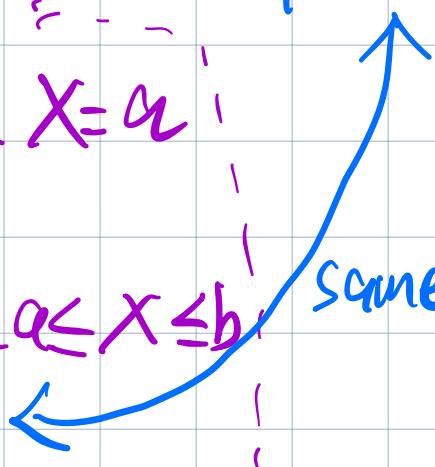
takes a value eg. $X = a$

or takes a range eg $a \leq X \leq b$, same.

$$P(a \leq X \leq b) =$$

一个数据值出现的
频率性的度量

Proportion ($a \leq X \leq b$)



Distribution of Prob. vs Pistr. of Data.

Categorical

↳ Prob. of event A.
 $P(A)$

↳ Marginal distribution

conditional Probability

$P(A|B)$

Conditional distribution

≥-way table.

⇒

	home	away
order food	231	134
don't order food	208	80

Prob. of event

$$P(\text{rooting for home team}) = \frac{31}{231+206+139+80}$$

randomly select 1 person, the probability of he/she rooting for home team is
Same concept.

Marginal

distribution

the proportion of people not for home team is

Conditional
Prob.

Given that a randomly selected person buy food, what is the probability that he is rooting for the home team.

$P(\text{rooting for home team} \mid \text{buys food})$.

Conditional distribution.

What is the proportion of people rooting for home team among the people that buys food.

Event Independence VS Variable No Association.

A&B

independent

无论B发生与否，A的概率率相同

$$P(A|B) = P(A) = P(A|B^C)$$

比/否 | 同. 没关系

Proportion of
people rooting for home

In people buying food.

Proportion of people
rooting for home team

In people not buying fd

Proportion of people rooting for home team

2-variables have no association.

Quantitative

Random Variable | Variable.

all have (1) Mean. pop. mean
 $E(x)$ or μ_x ; sample mean
only in Random Variable
We call it Expected Value.

用同样的符号，在 SRS 里，有相同数位

\Rightarrow Variance: $\sum (x_i - \mu_x)^2 w_i$

R. V. σ_x^2

$$w_i = p_i$$

when all x_i equally likely to happen.

$$p_i = \frac{1}{N}$$

Variable. $\sigma_x^2 \leq x^2$

$$w_i = \frac{1}{n-1} \text{ or } \frac{1}{N}$$



for Sample variance

Standard deviation.

R.V. σ_x

|

Variable δx or σ_x

Same variable transformation

$$Y = aX + b. \quad a, b \text{ constant.}$$

$$m_Y = a m_X + b. \quad | \text{ for all.}$$

$$\bar{Y} = a \bar{X} + b. \quad |$$

$$Z = aX + bY + c. \quad | \quad a, b, c \text{ constant}$$

$$m_Z = a m_X + b m_Y + c. \quad | \quad \text{all the same.}$$

$$\bar{Z} = a\bar{X} + b\bar{Y} + c$$

$$Y = aX + b$$

$$\text{Var}(Y) = a^2 \text{Var}(X) \quad \text{no } b.$$

$$\text{Std}(Y) = |a| \text{Std}(X)$$

$$\bar{Z} = a\bar{X} + b\bar{Y} + c$$

$$\text{Var}(Z) = a^2 \text{Var}(X) + b^2 \text{Var}(Y)$$

* X & Y independent / no relationship

$$\downarrow$$

$$\gamma = 0$$

Same for

R.V

and

V.

$$\text{Std}(\Sigma) = \sqrt{a^2 \text{Std}^2(X) + b^2 \text{Std}^2(Y)}$$

根据概率性质, 做推断.

Hypothesis testing. \rightarrow 算 p-value.
↑
probability.