22cs1 蒋翔翔

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~~Chapter~~ 概率统计

Section 2.4 and

Ex. 46

I think P(A|B) is larger, because a person is over 6 ft in height is a common thing given that he is a ~~basket~~ professional basketball ~~ple~~ player. But a person over 6 ft height is not usually a professio basketball player.

Ex. 50

a) $P(M \cap LS \cap Pr) = 0.5$ 0.05 we can conclude by the diagram

b) $P(M \cap Pr) = 0.5 + 0.07 + 0.05 = 0.12$

c) $P(SS) = 0.04 + 0.02 + 0.05 + 0.08 + 0.07 + 0.12 + 0.03 + 0.07 + 0.08 = 0.56$

$P(LS) = P(\overline{SS}) = 1 - P(SS) = 0.44$

d) $P(M) = 0.08 + 0.07 + 0.12 + 0.10 + 0.05 + 0.07 = 0.49$

$P(Pr) = 0.02 + 0.07 + 0.07 + 0.02 + 0.05 + 0.02 = 0.25$

e) $P(M|SS \cap PL) = \frac{0.08}{0.04 + 0.08 + 0.03} = 0.533$

f) $P(SS|M \cap PL) = \frac{0.08}{0.08 + 0.10} = 0.444$

$P(LS|M \cap PL) = 1 - P(SS|M \cap PL) = 0.556$

Ex. 58

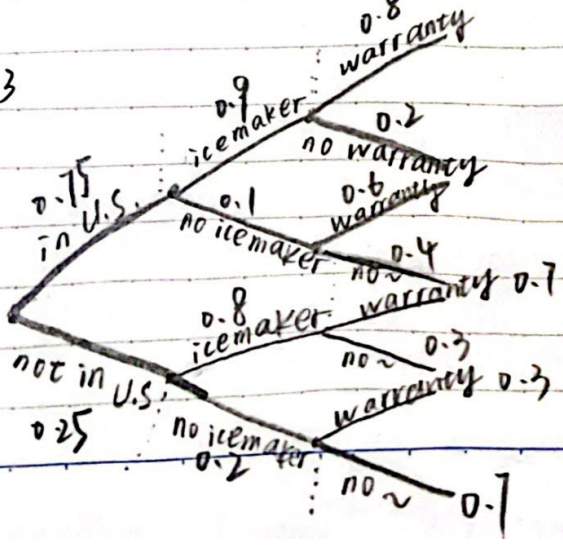
$$P(A \cup B|C) = \frac{P((A \cup B) \cap C)}{P(C)} = \frac{P(A \cap C \cup A \cap B \cap C)}{P(C)}$$

$$= \frac{P(A \cap C) + P(A \cap B \cap C) - P(A \cap B \cap C)}{P(C)}$$

$$= P(A|C) + P(B|C) - P(A \cap B|C)$$

Ex. 63

a)



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b) $P(A \cap B \cap C) = 0.75 \times 0.9 \times 0.8 = 0.54$

c) $P(B \cap C) = 0.75 \times 0.9 \times 0.8 + 0.25 \times 0.8 \times 0.7 = 0.68$

d) $P(C) = 0.75 \times 0.9 \times 0.8 + 0.75 \times 0.1 \times 0.6 + 0.25 \times 0.8 \times 0.7 + 0.25 \times 0.2 \times 0.3 = 0.74$

e) $P(A \mid B \cap C) = \frac{P(A \cap B \cap C)}{P(B \cap C)} = \frac{0.54}{0.68} = 0.794$

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Assignments for 4th week

Section 2.5

Ex.71

a) 因为 $P(B|A') = 1-0.7 = 0.3$. The reason is events A and B are indepent, so events A' and B' are indepent too.

b) $P(A\cup B) = P(A)+P(B)-P(A\cap B)$
$= P(A)+P(B)-P(A)\cdot P(B)$
$= 0.4+0.7-0.4\times 0.7$
$= 0.82$

c) $P(A\cap B'|A\cup B) = \frac{P((A\cap B')\cap(A\cup B))}{P(A\cup B)} = \frac{P(A\cap B')}{P(A\cup B)} = \frac{P(A)\cdot P(B')}{P(A\cup B)} = \frac{0.4\times(1-0.7)}{0.82} \approx 0.146$

Ex.72

As for A_1, A_2: $P(A_1\cap A_2)=0.11$, $P(A_1)\cdot P(A_2)=0.055 \neq P(A_1\cap A_2)$, is not independent

As for A_1, A_3; $P(A_1\cap A_3)=0.05$, $P(A_1)\cdot P(A_3)=0.0616 \neq P(A_1\cap A_3)$, is not independent

As for A_2, A_3; $P(A_2\cap A_3)=0.07$, $P(A_2)\cdot P(A_3)=0.07=P(A_2\cap A_3)$, so A_2, A_3 is independent

Ex.80

~~P(system work) = P~~. Let A denotes component 1 works, B ~ 2 works, C ~ 3 works, D ~ 4 works.

$P(\text{system work}) = P((A\cup B)\cup(C\cap D)) = P(A\cup B)+P(C\cap D)-P((A\cup B)\cap(C\cap D))$
$= 1-(1-0.9)^2+0.9^2-[(1-0.1^2)\times 0.9^2]$
$= 0.9981$

Ex.84

Let A_i denotes question # a, b, c, d, e ($i=1,2,3,4,5$)

a) $P(A_1) = 0.7^3 = 0.343$

b) $P(A_2) = 1-P(A_1) = 0.657$

c) $P(A_3) = 0.7\times 0.3\times 0.3\times 3 = 0.189$

d) $P(A_4) = P(A_3)+0.3^3 = 0.216$

e) $P(A_5) = \frac{P((A_1\cup A_2\cup A_3)\cap(A_1\cap A_2\cap A_3))}{P(A_1\cup A_2\cup A_3)} = \frac{P(A_1\cap A_2\cap A_3)}{P(A_1\cup A_2\cup A_3)} = \frac{P(A_1)}{1-0.3^3} = \frac{0.343}{0.973} \approx 0.353$

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Section 3.1

Ex.4

Zip code has five digits. So possible value of X may be 0,1,2,3,4,5.

eg.1: 12345, X=0 eg2: 50081, X=3, e.g.3: 12306, X=4 ....

Ex-5

Absolutely no. For example: Let X=1 if the component works, X=0 if the com~ doesn't work, S be the process will stop until meet an X=1, so the sample is infinite like {01, 001, 0001, ...}. but rv X only has 2 values and it is finite.

Ex.8

Y=3: SSS Y=4: FSSS Y=5: {FFSSS, SFSSS}

Y=6: {FFFSSS, SFFSSS, SSFSSS, FSFSSS}

Y=7: {FFFFSSS, SFFFSSS, SSFFSSS, FSFFSSS, FSSFSSS, SFSFSSS, FFSFSSS}

It seems no association?

Ex.10

a) T = 0,1,2,3,4,5,6,7,8,9,10

b) X = -6,0-5,-4,-3,-2,-1,0,1,2,3,4,5,6

c) U = 0,1,2,3,4,5,6

d) Z = 0,1,2

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Section 3.2

Ex.12 Denote A_i be the question a, b, c ($i=1,2,3,4$)

a) $P(A_1) = 0.05+0.10+0.12+0.14+0.25+0.17 = 0.83$

b) $P(A_2) = 1 - P(A_1) = 0.17$

c) $P(A_3) = 0.05 \quad P(A_1) - 0.17 = 0.66$

$P(A_4) = 0.05+0.10+0.12 = 0.27$

Ex.23

a) $P(X=2) = F(3) - F(2) = 0.2$

b) $P(X>3) = 1 - 0.67 = 0.33$

c) $P(2 \le X \le 5) = R \cdot F(5) - F(1) = 0.92 - 0.19 = 0.78$

d) $P(2<X<5) = P(2<X\le 4) = F(4) - F(2) = 0.92 - 0.39 = 0.53$

Ex.25

$Y=0$, that is $P(B) = p$

$Y=1$, that is: $(1-p)p$

$Y=2$, that is: $(1-p)^2 p$

$\vdots$

$Y=k$, that is: $(1-p)^k p$