DD office
1.5 hour
21 Apr 20

table 3
$P(D \text{ and } S) = \frac{139}{1314}$

STAT 131
21 Apr 20
1

$P(D \mid \text{not } S) = \frac{230}{732}$

association between X and Y

as smoking goes from (never smoked) to (current smoker) in the 1970s,

table 3

$P(\text{dead} \mid \text{never smoked}) > P(\text{dead} \mid \text{current smoker})$

$P(\text{dead}) \downarrow$ (!)

assoc. betw. X and Z
smoking age

as $X \uparrow$ $Z \downarrow$

assoc. betw. Y and Z
as $Z \uparrow$ $Y \uparrow$
dead age

P(at least 1 GP winner in this draw) = ?

grand prize

meta-code (process)

how to solve applied math problems

when solving a new problem $\mathbb{P}_{new}$, try to find another problem $\mathbb{P}_{old}$ with

2 properties: { (1) $\mathbb{P}_{old}$, $\mathbb{P}_{new}$ similar in relevant ways
(2) you know how to solve $\mathbb{P}_{old}$

T-S: P(1 or more T-S babies in 5 kids, both parents carriers) $P(TS) = \frac{1}{4}$

(*) P(1 or more (interesting things) happening

(**) in n IID trials < I, not I, $P(\text{I}) = p$) = ?

T-5

$$\circledast = 1 - \left(1 - \tfrac{1}{4}\right)^5$$

$$\circledast\circledast = 1 - (1-p)^n$$

(interesting thing ⓘ) $\leftrightarrow$ person i wins GP

for person i

$$P(ⓘ) = p = \frac{1}{292,201,338}$$

$$n = 182,900,000$$

$$P(8,m) = P\left(\begin{array}{c}\text{all 5}\\ W\end{array} \text{ and } \begin{array}{c}0\\ R\end{array}\right)$$

$$\overset{W,R \text{ indep}}{=} P\left(\begin{array}{c}\text{all 5}\\ W\end{array}\right) \cdot P\left(\begin{array}{c}0\\ R\end{array}\right)$$

$$= \frac{\binom{5}{5}\binom{64}{0}}{\binom{69}{5}} \cdot \frac{\binom{1}{0}\binom{25}{1}}{\binom{26}{1}} = \frac{1}{11688053.52}$$

$$= \left(\frac{1 \cdot 1}{11238513}\right)\left(\frac{1 \cdot 25}{26}\right)$$

THT 1 #3

meta-code (process) how to solve ~~prob. &~~ stat. problems

$\boxed{1}$ identify all different sources of information

$\boxed{2}$ Choose T/F symbols carefully to stand for those information sources

$\boxed{1}$ • who actually will be pardoned (truth) unknowns

• what warden says data

A = (A gets pardon)
B = (B ______)
C = (C ______)

(W = x) = (warden says x will not be pardoned)

⑤

$? = P(A \mid \underline{W = B})$ (we want)

unknown data

we know

data unknown

$P(W = A \mid A) = 0$

$P(W = B \mid B) = 0$

$P(W = C \mid C) = 0$

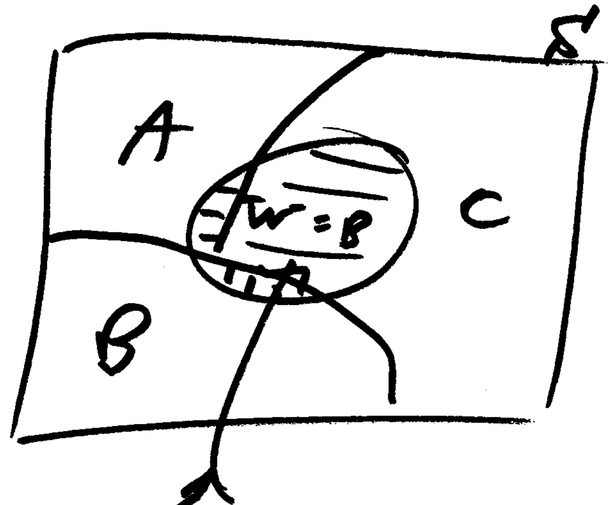
$P(W = B \mid A) = \frac{1}{2}$

$P(W = C \mid A) = \frac{1}{2}$

method II

$$P(A \mid W = B) = \frac{\overset{1/3}{P(A)} \cdot \overset{1/2}{P(W = B \mid A)}}{P(W = B)}$$

~~warden's behavior~~ hard to think about without knowing the truth so: extend the conversation: partition over truth (the unknown)



(we're computing $p(\bar{W} = B)$)

$$p(\bar{W} = B) = p(\bar{W} = B \text{ and } A) + p(\bar{W} = B \text{ and } B) + p(\bar{W} = B \text{ and } C)$$

p(rain in SC tomorrow | cold front moving in)