office
1.5 hour
session
23 Apr 20

natural language

hypothetically
meet a person

choosing to
person in a
like-at-random
fashion

90% of

attendees are

economist

\( E \)

\[ p(E) = 0.9 \]

\[ p = p(st|sh) = 0.37 \]

\[ = p(unknown | data) \]

unknown = $st$ or $E$

data = $sh$
\[ p(\text{win a prize}) = p(GP) + \sum_{\text{\$1000}}^{\frac{\text{\$4}}{R}} (\text{\$4}) \]

\[ 850 \times 60 = \frac{4}{R} \]

\[ = \frac{1}{292201338} + \frac{1}{116805352} + \ldots + \frac{1}{25.72} \]

\[ = \frac{1}{24.87} \]

\[ \boxed{3 \text{ unknown data} (\text{?} \text{?})} \]

\[ p(A | W = B) = ? \]

\[ A = (A \text{ got pardon}) \]

\[ B = (B) \]

\[ C = (c) \]

\[ (W = x) = x \in \{4\} \]

\[ (\text{under \$5000} \text{ won't get pardon} \]

\[ \text{let's compute } p(W = B), \text{ directly by partitioning over truth with} \]

\[ \frac{p(A)}{p(W = B)} = \frac{p(A) p(W = B | A)}{p(W = B)} \]

\[ \sqrt{p(A)} = \frac{1}{3} \sqrt{\frac{1}{2}} \]

\[ p(W = B) = ? \]
\[ P(\overline{w} = B) = P(\overline{w} = B, A) + P(\overline{w} = B, \overline{A}) + P(\overline{w} = B, C) \]

\[ \frac{1}{3} \Rightarrow \frac{1}{2} \]

\[ P(\overline{A}) \cdot P(\overline{w} = B | A) + P(\overline{B}) \cdot P(\overline{w} = B | \overline{B}) = \]

\[ \frac{1}{3} \cdot \frac{1}{2} \]

\[ + P(C) \cdot P(\overline{w} = B | C) = \frac{1}{2} \]

\[ = \frac{1}{6} + 0 + \frac{1}{3} = \frac{1}{2} \]

\[ \therefore P(A | \overline{w} = B) = \frac{\frac{1}{2} \cdot \frac{1}{3}}{\frac{1}{2} = \frac{1}{3}} = \frac{1}{3} \]

\[ = P(A) \]
If general situation is to abstract to support user's insights, \(\text{get} \theta \text{ights, } (\theta \in \mathbb{N})\):
write down a special case and play with it.

\[
1 = 1 = 1^2 \\
1 + 3 = 4 = 2^2 \\
1 + 3 + 5 = 9 = 3^2 \\
1 + 3 + \ldots + (2n-1) = n^2 \text{ for all integers } n \geq 1
\]