CSE 422
Artificial Intelligence

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Given that,

$P(\text{Criminal}) = 0.008$

$\therefore P(\neg \text{Criminal}) = 1 - 0.008 = 0.992$

$P(\text{guilty} \mid \text{Criminal}) = 0.98$

$\therefore P(\neg \text{guilty} \mid \text{Criminal}) = 0.02$

$P(\neg \text{guilty} \mid \neg \text{Criminal}) = 0.97$

$\therefore P(\text{guilty} \mid \neg \text{Criminal}) = 0.03$

$\therefore$ Probability of Criminal and jury find guilty,

$\therefore P(\text{guilty} \wedge \text{Criminal}) = 0.98 * 0.008 = 0.00784$

$\therefore$ Probability of not being a criminal but jury found guilty,

$P(\text{guilty} \wedge \neg \text{Criminal}) = 0.03 * 0.992 = 0.02976$

Now, As we considering a random person; so, number of total outcome total probability of found guilty by the jury.

$P(\text{guity}) = P(\text{guilty} \wedge \text{criminal}) + P(\text{guitty} \wedge \neg \text{criminal})$

$= 0.00784 + 0.02976$

$= 0.0376$

$$\therefore P(\text{Criminal} \mid \text{guilty}) = \frac{0.98 \times 0.008}{0.0376}$$

$$= 0.2085106$$

$$\therefore P(\neg \text{Criminal} \mid \text{guilty}) = \frac{0.03 * 0.992}{0.0376}$$

$$= 0.79149$$

$\because P(\neg \text{Criminal} \mid \text{guilty}) > P(\text{Criminal} \mid \text{guilty})$ therefore, we can say that if we pick a random person who is found guilty by the jury : it's more likely to be not criminal.