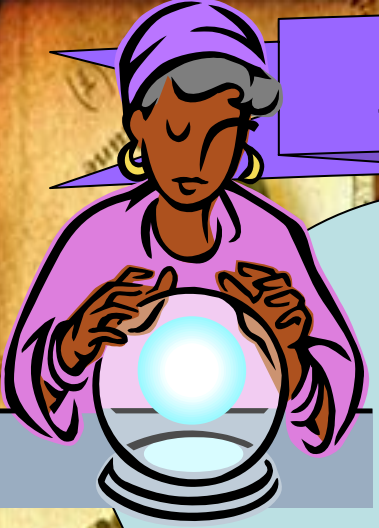
Fortune-teller Madam Bayes' Advice

My boyfriend has flirtatious tendencies…he cheated me before.
He said that he would never have affairs with other girls.

But….recently he very often (>3 per week) comes home so late.
He says that he doesn't cheat me…actually, he is very nice
and talkative when he is at home.
I still suspect that he is cheating me again…but **no evidence**.

Ok. I will read your fortune
based on "*Bayesian rule*"…



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According to the male behavior's data (refer the file male_behavior.dat*), the fact that the usual men who cheated their partner before come home late night shows;

P(cheating) = 0.6

P(not cheating) = 0.4

From the data above, the probability for cheating is not so high…

And your boyfriend is very nice and talkative…from my abundant experience as a fortune-teller (n>300), most men are nice and talkative when they have the secrets…therefore;

P(nice and talkative | cheating) = 0.8

P(not nice and not talkative | cheating) = 0.2

P(nice and talkative | not cheating) = 0.3

P(not nice and not talkative | not cheating) = 0.7

Based on Bayes' rule,

$$\Pr(B \mid A) = \frac{\Pr(A \mid B)\Pr(B)}{\Pr(A)} = \frac{\Pr(A \mid B)\Pr(B)}{\Pr(A \mid B)\Pr(B) + \Pr(A \mid \overline{B})\Pr(\overline{B})}$$

P(cheating | nice and talkative)

= P(nice and talkative | cheating)*P(cheating)

/ {P(nice and talkative | cheating)*P(cheating)+

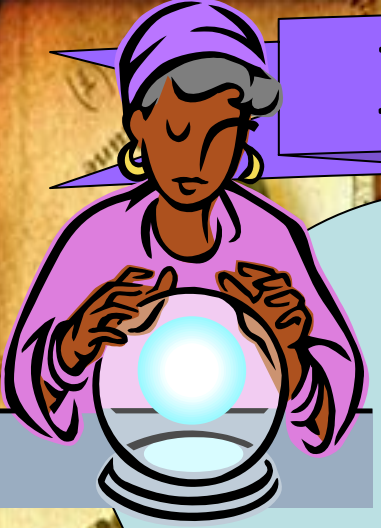
P(nice and talkative | not cheating)*P(not cheating)}

=0.8*0.6/(0.8*0.6 + 0.3*0.4)

=0.80

Hmm…0.8…but it is up to you whether 0.8 is high or not…

(*It is fictional data!)



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By Aki Shiozawa