Naïve Bayes Classifier: An Example

- Compute $P(X|C_i)$ for each class

$P(age = "<= 30" | buys\_computer = "yes") = 5/11 = 0.455$

$P(age = "<= 30" | buys\_computer = "no") = \frac{1}{7} = 0.143$

$P(income = "medium" | buys\_computer = "yes") = 2/9 = 0.222$

$P(income = "medium" | buys\_computer = "no") = 2/5 = 0.4$

$P(student = "yes" | buys\_computer = "yes") = 6/9 = 0.667$

$P(student = "yes" | buys\_computer = "no") = 1/5 = 0.2$

$P(credit\_rating = "fair" | buys\_computer = "yes") = 6/9 = 0.667$

$P(credit\_rating = "fair" | buys\_computer = "no") = 2/5 = 0.4$

$P(X|C_i) = P(X | buy\_computer = "yes") = 0.455 \times 0.222 \times 0.667 \times 0.667 = 0.045$

$P(X | buy\_computer = "no") = 0.443 \times 0.4 \times 0.2 \times 0.4 = 0.002$

$P(X|C_i) * P(C_i) = P(X | buys\_computer = "yes") + P(X | buys\_computer = "yes")$

$= 0.045 \times 0.643 = 0.029$

$P(X | buys\_computer = "no") * P(X | buys\_computer = "no")$

$= 0.002 \times 0.357 = 0.001$ "yes"

age	income	student	credit_rating	buys_computer
<=30	high	no	fair	no
<=30	high	no	excellent	no
31…40	high	no	fair	yes
>40	medium	no	fair	yes
>40	low	yes	fair	yes
>40	low	yes	excellent	no
31…40	low	yes	excellent	yes
<=30	medium	no	fair	no
<=30	low	yes	fair	yes
>40	medium	yes	fair	yes
<=30	medium	yes	excellent	yes
31…40	medium	no	excellent	yes
31…40	high	yes	fair	yes
>40	medium	no	excellent	no