

Probabilities recap

conditional probabilities: $P(x|y) = \frac{P(x,y)}{P(y)}$

Product rule: $P(x,y) = P(x|y)P(y)$

chain rule: $P(x_1, \dots, x_n) = P(x_1)P(x_2|x_1)P(x_3|x_1, x_2) \dots = \prod_{i=1}^n P(x_i | x_1, \dots, x_{i-1})$

X, Y independent iff: $\forall x, y: P(x, y) = P(x)P(y)$

X and Y are conditionally independent given Z iff: $\forall x, y, z: P(x, y|z) = P(x|z)P(y|z)$
($X \perp\!\!\!\perp Y | Z$)