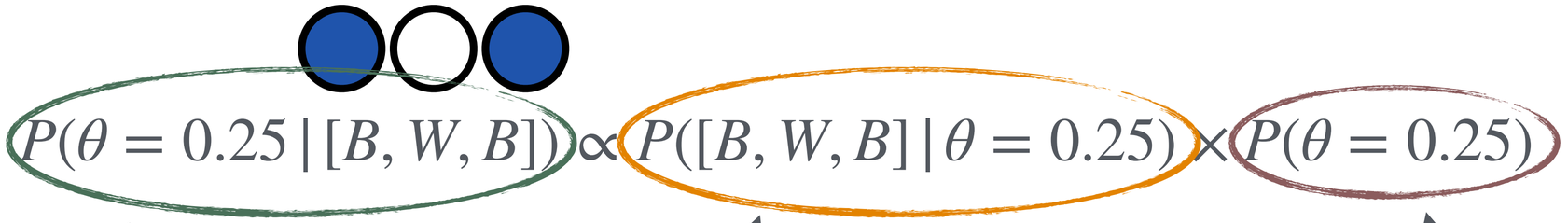
Bringing it all together



Posterior probability of the conjeture, considering all the information in the data and the prior

Likelihood, how many ways to produce the data under the assumed conjecture

Prior, other information about the conjecture not related to the data

What is Bayesian Statistics?

ML: What is the parameter value that maximizes the probability of having generated the data:

$$\underset{\theta}{\operatorname{argmax}} \left[P(y \mid \theta) \right]$$

Bayesian: What is the probability distribution of parameter values given the data:

$$P(\theta \mid y) \propto P(\theta) P(y \mid \theta)$$