BAYES THEOREM

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Bayes Theorem finds the probability of an event based on other things we know

Posterior

$$P(A|B) = \frac{P(A)*P(B|A)}{P(B)}$$

Prior Likelihood

Normalizing Constant

6 Easy Steps For Solving A Bayes Problem

1. Determine the possibilities, and what is being observed

2. Estimate initial probabilities

3. For each initial possibility, calculate the odds of getting the observation

4. Multiply the initial probabilities (Step 2) by the probabilities based on the observation (Step 3) for each of the initial possible answers

5. Normalize The Results

6. Repeat Steps 2-5 over for each new observation

Example

Suppose that your friend has 3 dice, one each with 4, 6, and 8 sides.
He draws one die at random, rolls it one time without showing you, and reports the result as having rolled a 2.
For each of the dice, what are the odds that was the die drawn

	Prior	Likelihood		Posterior
Step 1	Step 2	Step 3	Step 4	Step 5
Die	Initial Probabilities	Chance of Roll	New Probability	Normalized Final Result
4	1/3	1/4	1/12	6/13
6	1/3	1/6	1/18	4/13
8	1/3	1/8	1/24	3/13
		Total Probability	13/72	
		Normalizing Constant		