Probability Theory

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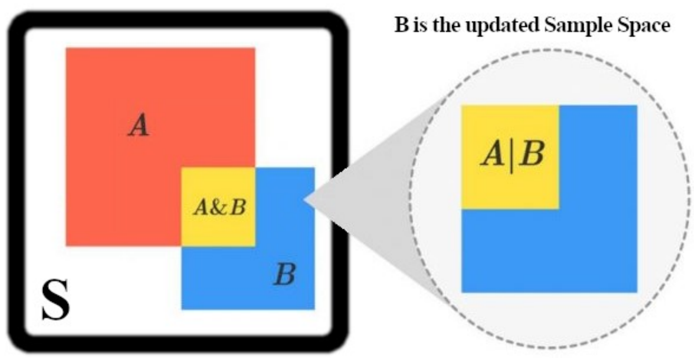
Previous Lecture

- Story Proofs
- General definition of probability
- General properties of probability

§2.1 - Conditional Probability, the Importance of Thinking Conditionally

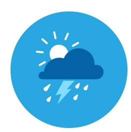
What if you've calculated a prob for some event A, and then some new information B, relevant to the event becomes known? How do you update (*condition*) your prob?

Conditional probability $P(A|B)$ shows how to **incorporate evidence** into our understanding of the world in a logical, coherent manner.



$P(A)$ being updated to $P(A|B)$ if we know B occured.

Ex (**Conditional Rain**). Let $P(R)$ be our assessment of the probability of rain before looking outside.



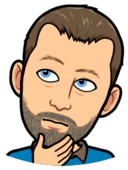
Then, we hear dripping B_1, we notice it smells of rain B_2, etc.

Incorporating these bits of evidence into our prob, we write: $P(R|B_1, \ldots, B_n)$.

If eventually we observe that it's raining, our conditional probability becomes 1.

Def (**Conditional Probability**): If A, B are events with $P(B) > 0,$ then the conditional probability of A given B, denoted $P(A|B)$, is: $P(A|B) = \frac{P(A \cap B)}{P(B)}$.

What did we learn?



- Conditional Probability