Stats 130
Discussion Notes 2

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- Conditional Probability

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

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

  The second formulation is Bayes Theorem.

- Partitions

  $P(A) = P(\bigcup_{i=1}^{n} A \cap B_i) = \sum_{i=1}^{n} P(A \cap B_i)$

  We can use intersection to split an event into mutually exclusive partitions, and then we can sum back up due to σ additivity.

  The denominator of Bayes theorem is the hardest part to calculate in non-trivial examples. It is what held back Bayesian statistics until the rise of better computational methods.

  $P(B) = P(B|A)P(A) + P(B|A^{\complement})P(A^{\complement})$