



Naive Bayesian Classifier | ML LAB 5 | VTU

By Prajwal Mani

What is Bayes Theorem?

A handwritten diagram illustrating Bayes' Theorem. The equation $P(A|B) = \frac{P(B|A) P(A)}{P(B)}$ is written in the center. Annotations with arrows explain each term:
 - Above the equation, "THE PROBABILITY OF 'B' BEING TRUE GIVEN THAT 'A' IS TRUE" has a downward arrow pointing to $P(B|A)$.
 - To the right, "THE PROBABILITY OF 'A' BEING TRUE" has a curved arrow pointing to $P(A)$.
 - Below the equation, "THE PROBABILITY OF 'A' BEING TRUE GIVEN THAT 'B' IS TRUE" has an upward arrow pointing to $P(A|B)$.
 - Below the denominator, "THE PROBABILITY OF 'B' BEING TRUE" has an upward arrow pointing to $P(B)$.

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

Bayes theorem
talks about
Conditional
probability.

Naive Bayesian Classifier Algorithm

Algorithm:

NaiveBaiseClassifier(training_examples, New_Instance)

Each instance \mathbf{x} is described by a conjunction of attribute values(a_i) and the target V can take j finite set of values.

- For each value j in target estimate the $P(V_j)$
- For each attribute in the training example estimate Estimate the $P(a_i|V_j)$
- Classify each instance as per the rule in equation

$$v_{NB} = \underset{v_j \in V}{\operatorname{argmax}} P(v_j) \prod_i P(a_i|v_j)$$

Where V_{NB} denotes the target value output by the naive Bayes classifier

- Output V_{NB}