Introduction to Naive Bayes Classification and Its Implementation in Python

What is Naive Bayes Classification? How to implement it in Python?

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Naive Bayes Classification

The naive Bayes classification algorithm is one of the popularly used **Supervised machine learning** algorithms for classification tasks. It is based on the **Bayes theorem** in probability.

Naive Bayes Classifier is called naive because it considers every input variable as an independent event (Where the outcome of one event does not affect the outcome of other events **Example:** the outcome of rolling the first die does not affect the outcome of rolling the next die). To understand the Naive Bayes algorithm, we need to be familiar with the Bayes theorem.

Applications of Naive Bayes Classification Algorithm

Following are some of the largely used applications of naive Bayes classification Algorithm,

1. Text Classification

2. Multiclass prediction

3. Spam Filteration

4. Recommendation System

5. Sentiment Analysis

Bayes Theorem

Bayes Theorem (or) Bayes law (or) Bayes rule describes the conditional probability of an event, based on prior knowledge of conditions that might be related to the event. Bayes theorem is widely used in machine learning because of its effective way to predict classes with precision and accuracy.

Bayes theorem is mathematically stated as,

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

Bayes theorem formula

where,

P(A|B) = Probability of A given that event B (or) Posterior probability of A given B.

P(B|A) = Probability of B given that event A (or) the likelihood of A given B.