🚀 **Naive Bayes Classifier: A Quick Overview** 📊
The Naive Bayes classifier is one of the most simple yet powerful probabilistic models used for classification tasks! 🤖✨
🔍 It's based on Bayes' Theorem which gives us the probability of a class given the input features. It assumes that the features are independent (hence "naive") – a simplifying assumption that works surprisingly well in many scenarios. 🎯

💡 **Key Insights:**
Formula:
$P(C|X)=P(C|X) * P(C) / P(X)$

Where:
$P(C|X)$ is the probability of class C given the features X.
$P(X|C)$ is the likelihood of observing features X given class C.
$P(C)$ is the prior probability of class C.
$P(X)$ is the probability of the features X.

Types of Naive Bayes:
Gaussian Naive Bayes (for continuous data) 🔢
Multinomial Naive Bayes (for discrete data like word counts in NLP) 📝
Bernoulli Naive Bayes (for binary features, like spam classification) 📨

Pros:
Fast & simple 🤖
Works well with a large number of features 💼
Great for high-dimensional data like text classification 📚

Cons:
The "naive" assumption of feature independence doesn't always hold true 🤔
Doesn't perform well if features are strongly correlated 📉

🛠️ **Common Applications:**
Spam email classification 📧
Sentiment analysis 💬
Medical diagnosis 🏥
Document categorization 📑

🔑 **Key Takeaway:**
Naive Bayes is a go-to algorithm for classification when speed and simplicity are priorities. Despite its simplistic assumptions, it often works surprisingly well in practice! 🚀

GitHub Code: https://github.com/NafisAnsari786/Machine-Learning-Algorithms/tree/main/13%20Naive%20Bayes