

# Naïve Bayes Classifiers

What are they? Probabilistic classifiers based on Bayes' Theorem (mathematical formula used to calculate conditional probabilities)

- Assumption that input variables are independent and that all predictors have equal effect on outcome
- Naïve: ignores relationships between predictors

Strengths:

- simple
- fast
- accurate
- reliable

Weaknesses:

- predictors are dependent in most real life cases
- "Zero Frequency": categorical variable not observed in training set leads to assumption of "zero" probability

High bias but low variance

Perform well with categorical input variables

Particularly useful for natural language processing

Use examples: spam filtering, sentiment analysis

Conditional probability: Bayes' Theorem

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