

Implementation and Comparison of K-Nearest Neighbors and Naïve Bayes Classifiers

1 Naïve Bayes Implementation and Comparison

1.1 Naïve Bayes Implementation from Scratch

The classifier is implemented using Bayes' Theorem:

$$P(Class|Features) = \frac{P(Features|Class)P(Class)}{P(Features)} \quad (1)$$

1.2 Implementation Steps

1. Load and preprocess the dataset.
2. Compute prior probabilities $P(Class)$.
3. Compute likelihood probabilities $P(Features|Class)$.
4. Use Bayes' rule to classify new examples.
5. Evaluate performance.

1.3 Naïve Bayes Using Scikit-learn

For comparison, we use Scikit-learn's `CategoricalNB` classifier.

1.4 Performance Comparison

Model	Accuracy
Naïve Bayes from Scratch	(0.60)
Scikit-learn Naïve Bayes	(0.60)

Table 1: Accuracy Comparison of Both Models

2 Conclusion

Both classifiers were implemented from scratch and compared with Scikit-learn implementations. The results show that while custom implementations provide insights into the algorithms, Scikit-learn versions are optimized for performance.