**Model Performance Analysis Summary**

This analysis evaluates the performance of three classification algorithms — **K-Nearest Neighbors (KNN)**, **Decision Tree**, and **Naive Bayes** — based on their accuracy in a supervised learning task. The comparison was visualized in a bar chart.

**1. K-Nearest Neighbors (KNN)**

KNN was tested with three different values of k (3, 5, and 7). All three configurations yielded very high and nearly identical accuracy, with KNN (k = 7) achieving the highest overall performance. The slight advantage of k = 7 suggests that a larger neighborhood size helped reduce noise sensitivity and provided more reliable predictions by averaging across a broader sample.

**2. Decision Tree**

Two decision tree models were tested using different splitting criteria:

Gini Index and Entropy. Both performed well, with Decision Tree (Entropy) slightly outperforming its Gini-based counterpart. This minor difference indicates that entropy may have provided more informative splits in this dataset. Decision trees are advantageous due to their interpretability and ability to capture non-linear patterns.

**3. Naive Bayes**

The Naive Bayes model recorded the lowest accuracy among the compared models, though still relatively competitive. Its performance may have been affected by the strong independence assumption, which does not always hold in real-world data. Despite this, Naive Bayes remains a fast and effective baseline for classification tasks, particularly with high-dimensional data or when quick predictions are needed.

**Conclusion**

Among the three models, KNN (especially with k = 7) emerged as the best performer, closely followed by the decision tree models. Naive Bayes, while efficient, lagged slightly in accuracy. The results highlight the importance of model selection and hyperparameters tuning, as well as understanding the underlying assumptions and data characteristics.