Name – Alamin Seikh

Roll No – 19

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Topic - k nearest neighbours classification Report

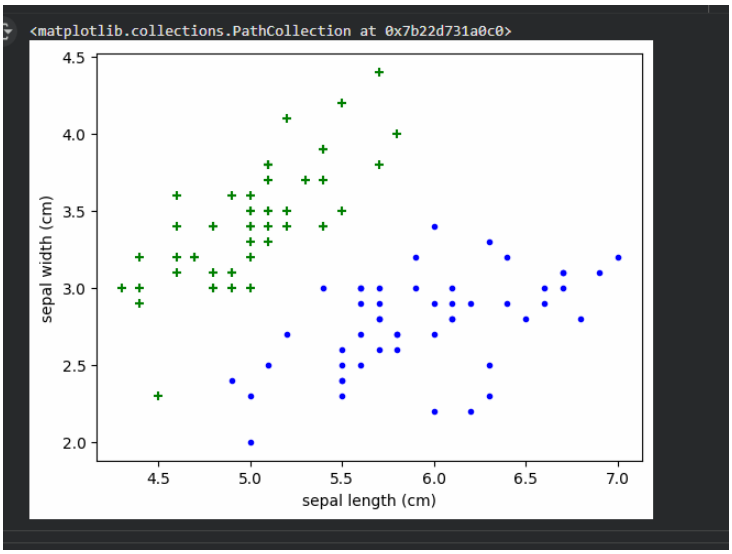
K-Nearest Neighbours (KNN) is a simple yet powerful supervised learning algorithm used primarily for classification tasks. It classifies data points based on the majority label of their 'k' closest neighbours in the feature space.

Instance-based learning: KNN doesn't build a model during training. Instead, it stores the entire dataset and makes predictions only when queried.

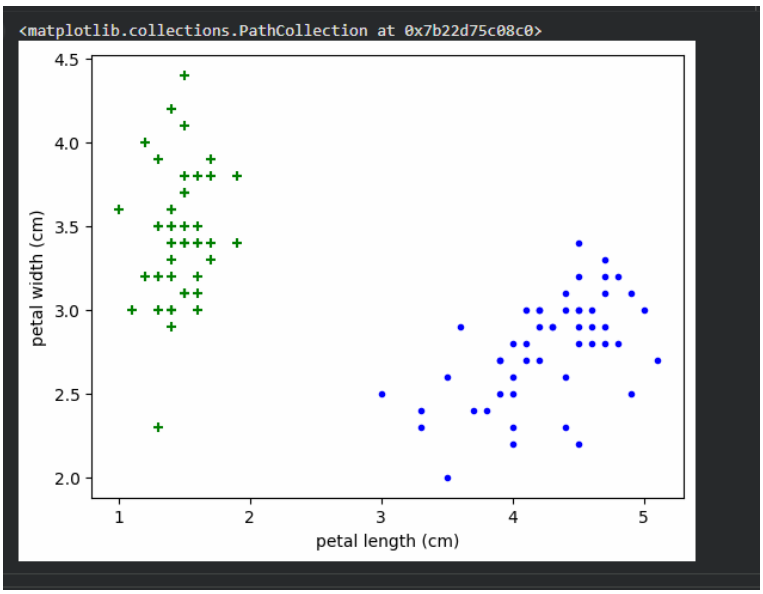
Non-parametric: It makes no assumptions about the underlying data distribution.

- **Precision**: For each class, precision is the ratio of correctly predicted positive observations to the total predicted positives. A high precision means a low false positive rate.
    - For class 0 (setosa), the precision is 1.00, meaning all instances predicted as setosa were actually setosa.
    - For class 1 (versicolor), the precision is 1.00, meaning all instances predicted as versicolor were actually versicolor.
    - For class 2 (virginica), the precision is 0.86, meaning 86% of instances predicted as virginica were actually virginica.
- **Recall (Sensitivity)**: For each class, recall is the ratio of correctly predicted positive observations to the all observations in the actual class. A high recall means a low false negative rate.
    - For class 0, the recall is 1.00, meaning all actual setosa instances were correctly identified.
    - For class 1, the recall is 0.92, meaning 92% of actual versicolor instances were correctly identified.
    - For class 2, the recall is 1.00, meaning all actual virginica instances were correctly identified.
- **F1-Score**: The F1-score is the harmonic mean of Precision and Recall. It's a good metric when you have an uneven class distribution.
    - The F1-scores are high for all classes (1.00, 0.96, and 0.92), indicating good performance.
- **Support**: The support is the number of actual occurrences of each class in the specified dataset (in this case, the test set).
    - There are 11 instances of class 0, 13 of class 1, and 6 of class 2 in the test set.
- **Accuracy**: The overall accuracy of the model is 0.97, meaning the model correctly predicted the class for 97% of the instances in the test set.
- **Macro Avg**: The average precision, recall, and F1-score across all classes, without considering class imbalance.
- **Weighted Avg**: The average precision, recall, and F1-score across all classes, weighted by the support of each class.

1) Sapel length and width



2) Petal length and width



3) heat map