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PROJECT 4

Iris Dataset

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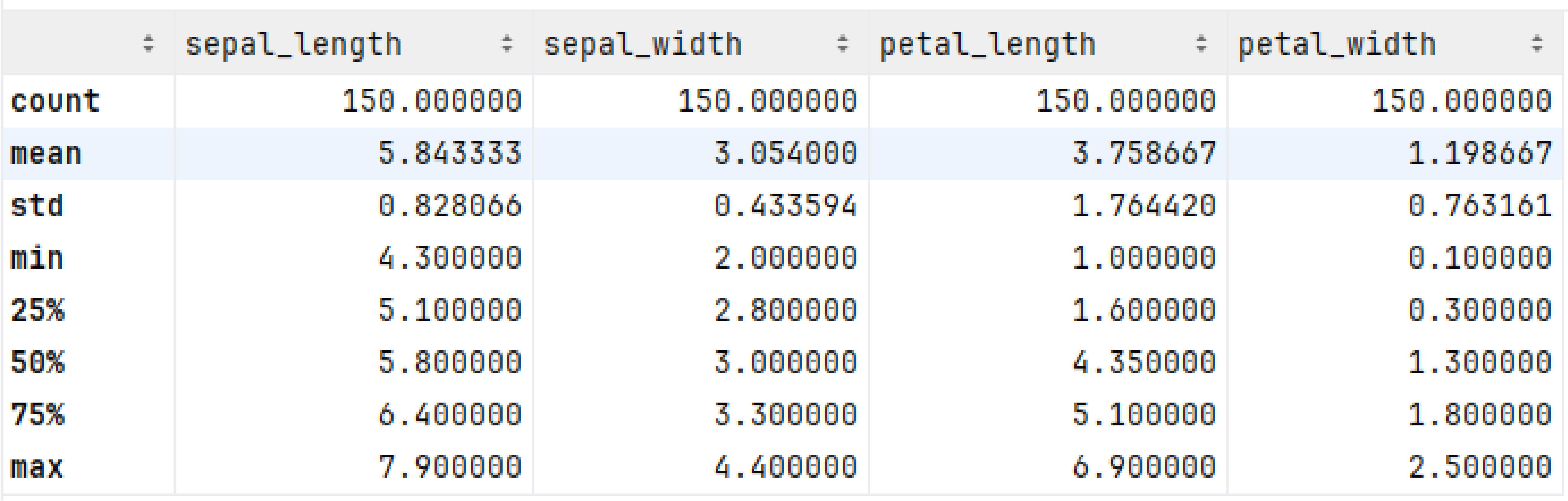
DATA DESCRIPTION

The Iris dataset is a popular dataset in data science, it consists of 4 Features: Sepal length, Sepal width, Petal length and Petal width (all in cm), and it has one target variable: the Species

DATA EXPLORATION

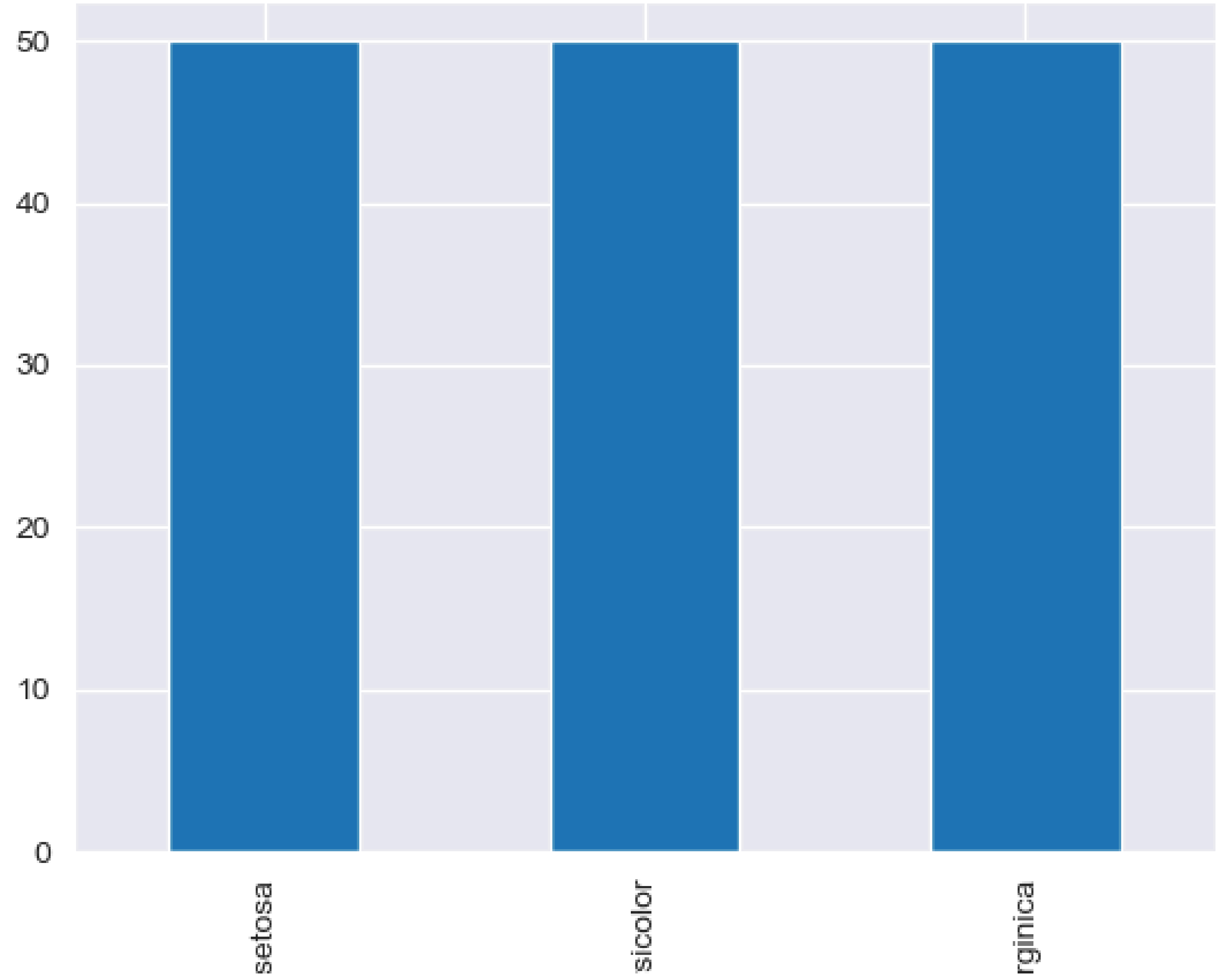
- The dataset containts 150 rows and 5 columns.
- The dataset had no null values.
- We explored descriptive statistics of each numeric feature.
- We split the data to x (4 features) and y (the target).

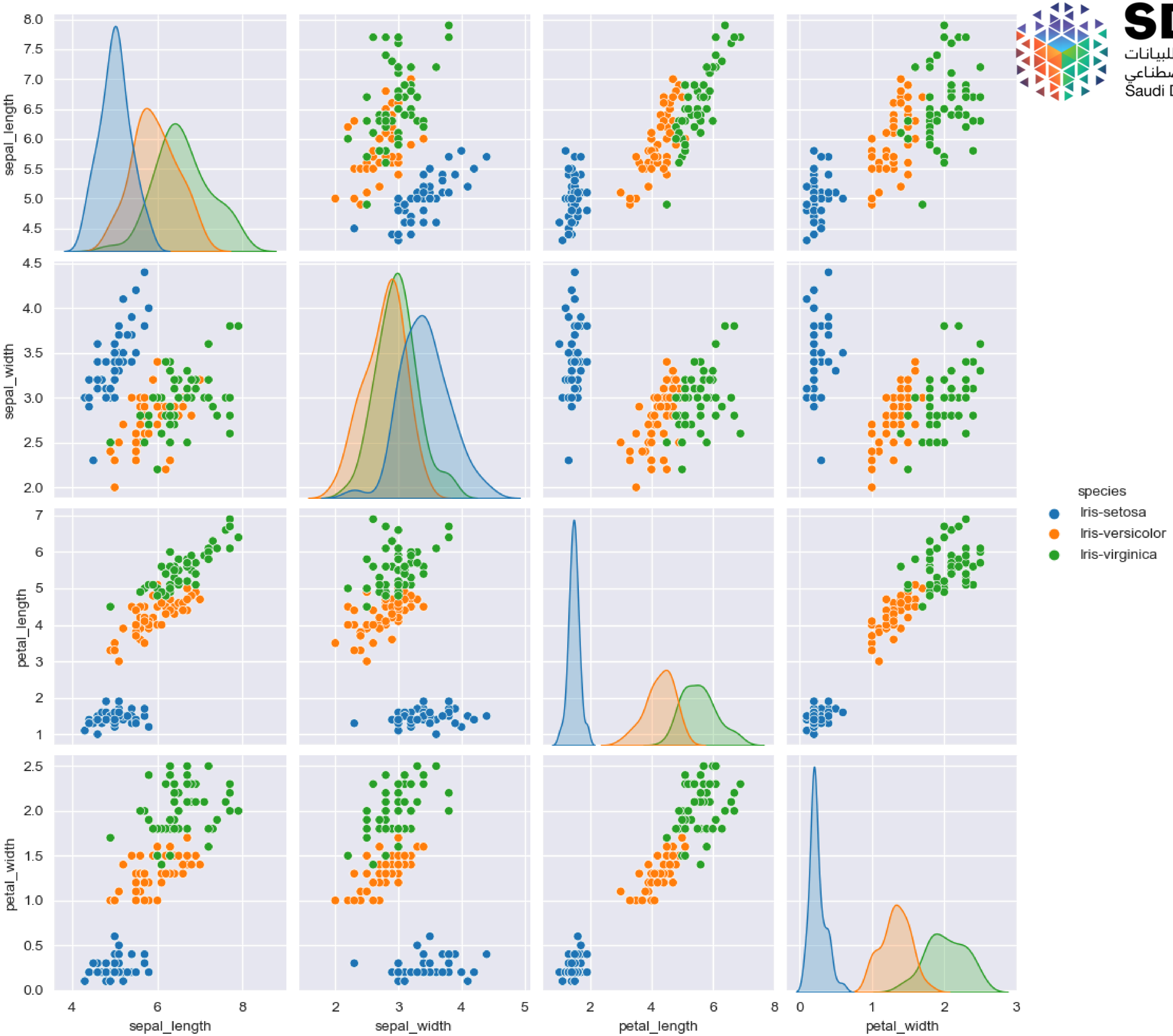
DESCRIPTIVE STATISTICS



	sepal_length	sepal_width	petal_length	petal_width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.054000	3.758667	1.198667
std	0.828066	0.433594	1.764420	0.763161
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

THE DISTRIBUTION OF THE 3 SPECIES



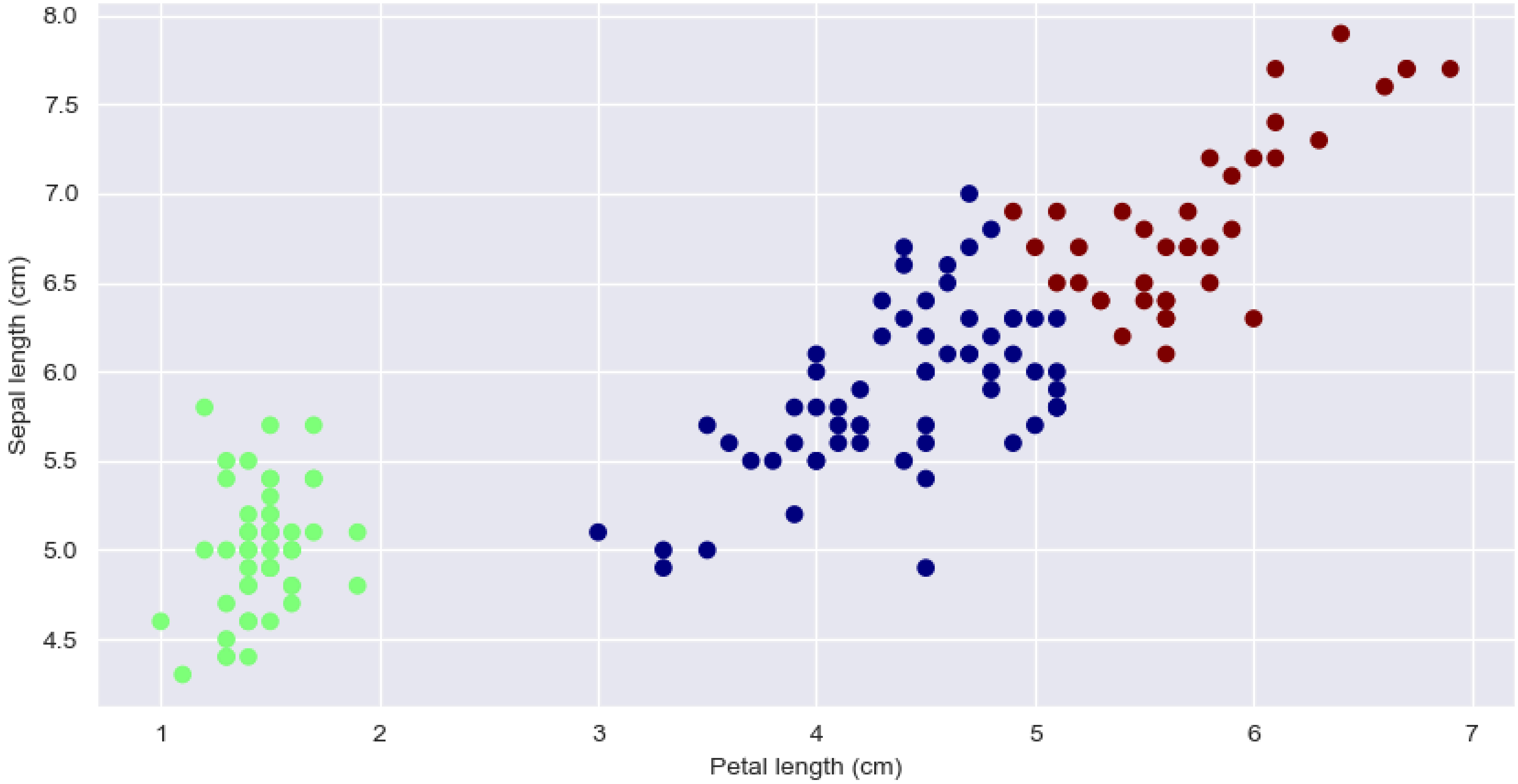

sepal_length
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
sepal_width
4.5
4.0
3.5
3.0
2.5
2.0
petal_length
7
6
5
4
3
2
1
petal_width
2.5
2.0
1.5
1.0
0.5
0.0
4
6
8
sepal_length
2
3
4
5
sepal_width
2
4
6
8
petal_length
0
1
2
3
petal_width
species
Iris-setosa
Iris-versicolor
Iris-virginica

02.

UNSUPERVISED LEARNING

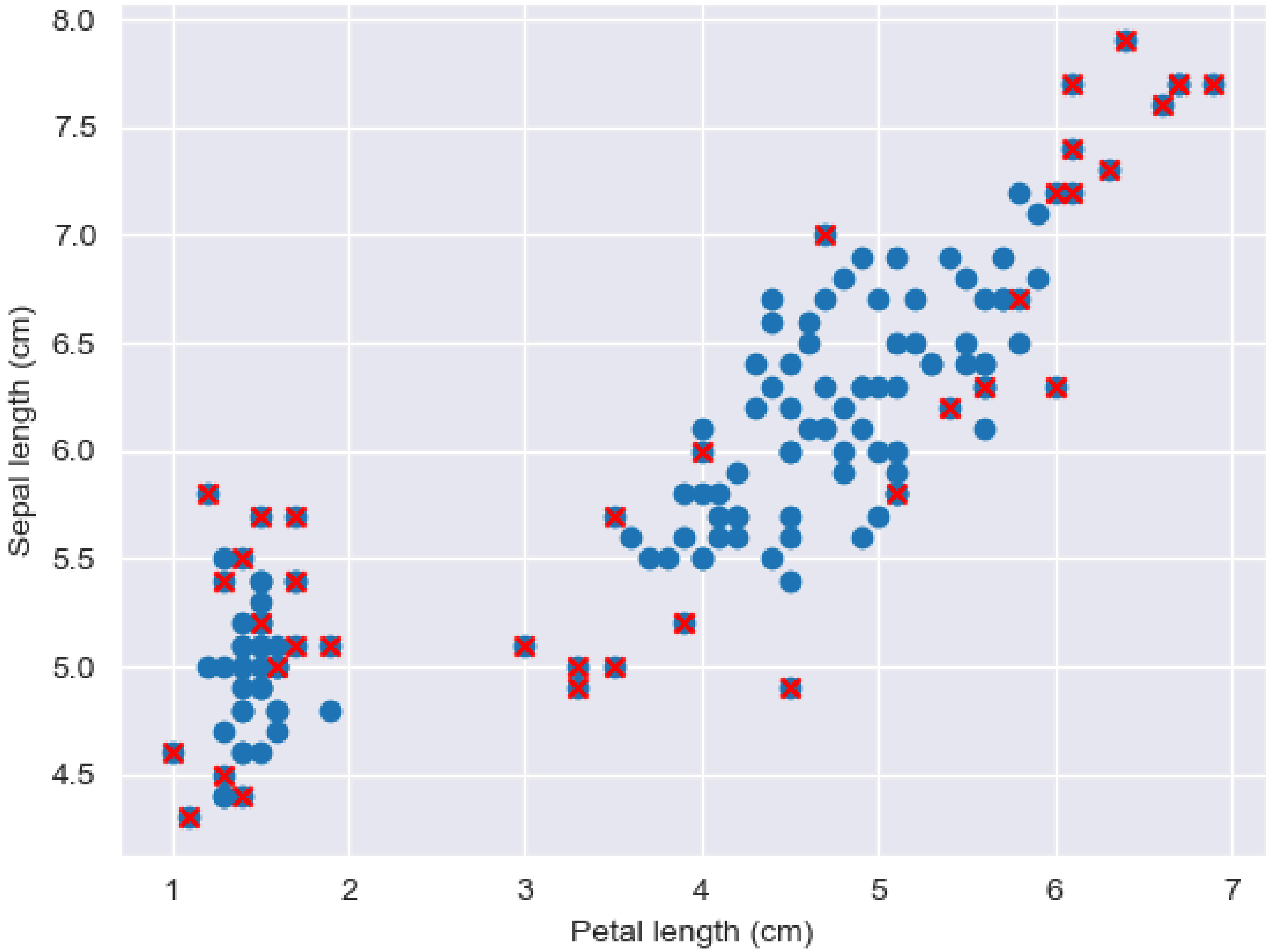
K-MEANS CLUSTERING

- We used K-means clustering to cluster the data.
- We can see how easily K-means clustered the data correctly assuming we know the correct k value, but we can use the elbow method to find the best k value.



ISOLATION FOREST

- We used Isolation Forest to find outliers in the data.
- The Isolation Forest found outliers but it failed to recognize that the third species is not an outlier.



03.

SUPERVISED LEARNING

SUPERVISED LEARNING

- we chose F1 score (micro) as an evaluation method for the classifier.
- split the data to training and testing sets.
- we chose Logistic Regression as a baseline classifier and it managed to reach an F1 score of 96.6%.

04.

MODEL COMPARISON

MODEL COMPARISON

- We chose the following models: SVC, RandomForestClassifier, GradientBoostingClassifier, AdaBoostClassifier, CategoricalNB.
- Out of the chosen models the best ones were LogisticRegression, SVC, RandomForestClassifier.

04.

MODEL TUNING

MODEL TUNING

- Preformed hyperparameter on logistic regression using grid search.
- We tuned the model on the best hyperparameters and it reached an F1 score of 97.5%.
- Implemented an ensemble (Voting ensemble) of a group of the top performing models and used bagging on each one and got 94.1% as an F1 score.

THANK YOU